A Stereo-Atlas of Ostracod Shells

edited by R. H. Bate, J. W. Neale, Lesley M. Sheppard
and David J. Siveter

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Acknowledgments

This Volume of the *Stereo-Atlas* has been aided by generous financial support from Robertson Research International Limited.

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The front cover shows a ventral view of the Cretaceous **Pattersoncypris micropapilosa** Bate preserved with appendages.

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ON *EOGRAPHIODACTYLUS SULCATUS* SCHALLREUTER

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Eographiodactylus sulcatus Schallreuter, 1975

1975 *Eographiodactylus sulcata* sp. nov. R. E. L. Schallreuter, *Neues Jb. Geol. Paläont. Abh.*, **150** (3), 279 - 281, fig. 1.

Holotype: Geologisch-Paläontologisches Institut, University of Hamburg (GPIH) no. **2192**, LV (posterodorsally incomplete).
[Paratype: GPIH no. **2193**].

Type locality: Beach N of Lickershamn, Isle of Gotland (Baltic Sea); lat. 57° 49.5' N, long. 18° 30.5' E. Öjlemyrflint erratic boulder no. G 4, coll. by Horst Kaufmann in 1974; Upper Ordovician.

Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg (GPIH) nos. **2212** (RV: Pl. 7, 2, figs. 1, 3), **2213** (LV: Pl. 7, 2, fig. 2; Pl. 7, 8, fig. 4), **2214** (LV: Pl. 7, 4, figs. 1, 3; Pl. 7, 6, fig. 3), **2215** (larval LV: Pl. 7, 4, fig. 2; Pl. 7, 6, fig. 4), **2216** (posteroventrally incomplete RV: Pl. 7, 6, fig. 1) and **2217** (LV: Pl. 7, 6, fig. 2; Pl. 7, 8, figs. 1 - 3). Specimens **2213 - 2215** are from the Öjlemyrflint erratic boulder no. Sy 35 from the Kaolinsand (Pliocene-Pleistocene) of Braderup, Isle of Sylt (N Frisian Is., N Sea), Germany; lat. 54° 56' N, long. 8° 21' E; coll. by Ulrich von Hacht in 1976. **2212, 2216** and **2217** are from the Öjlemyrflint erratic boulder no. G 35 from the beach N of Lickershamn, Isle of Gotland (Baltic Sea), Sweden; lat. 57° 49.5' N, long. 18° 30.5' E; coll. by the author in 1976.

Explanation of Plate 7, 2

Figs. 1, 3, RV (**GPIH 2212**, 605 μm long without spine): fig. 1, ext. lat.; fig. 3, ext. vent. Fig. 2, LV, ext. lat. (**GPIH 2213**, 685 μm long without spine).
Scale A (100 μm; x 140), fig. 1; scale B (100 μm; x 115), fig. 2; scale C (100 μm; x 180), fig. 3.

Diagnosis: Up to 0.69mm long (without spine). Sulcus distinct. Velum-like structure reaching dorsal border anteriorly, diverges away from free margin in posterior direction, terminating in a posteroventral spine. Marginal ridge very faint. Lateral surface smooth except for some fine pores or pustulae; velum-like structure radially striated in anterior regions, spur-like part has hollow tubules.

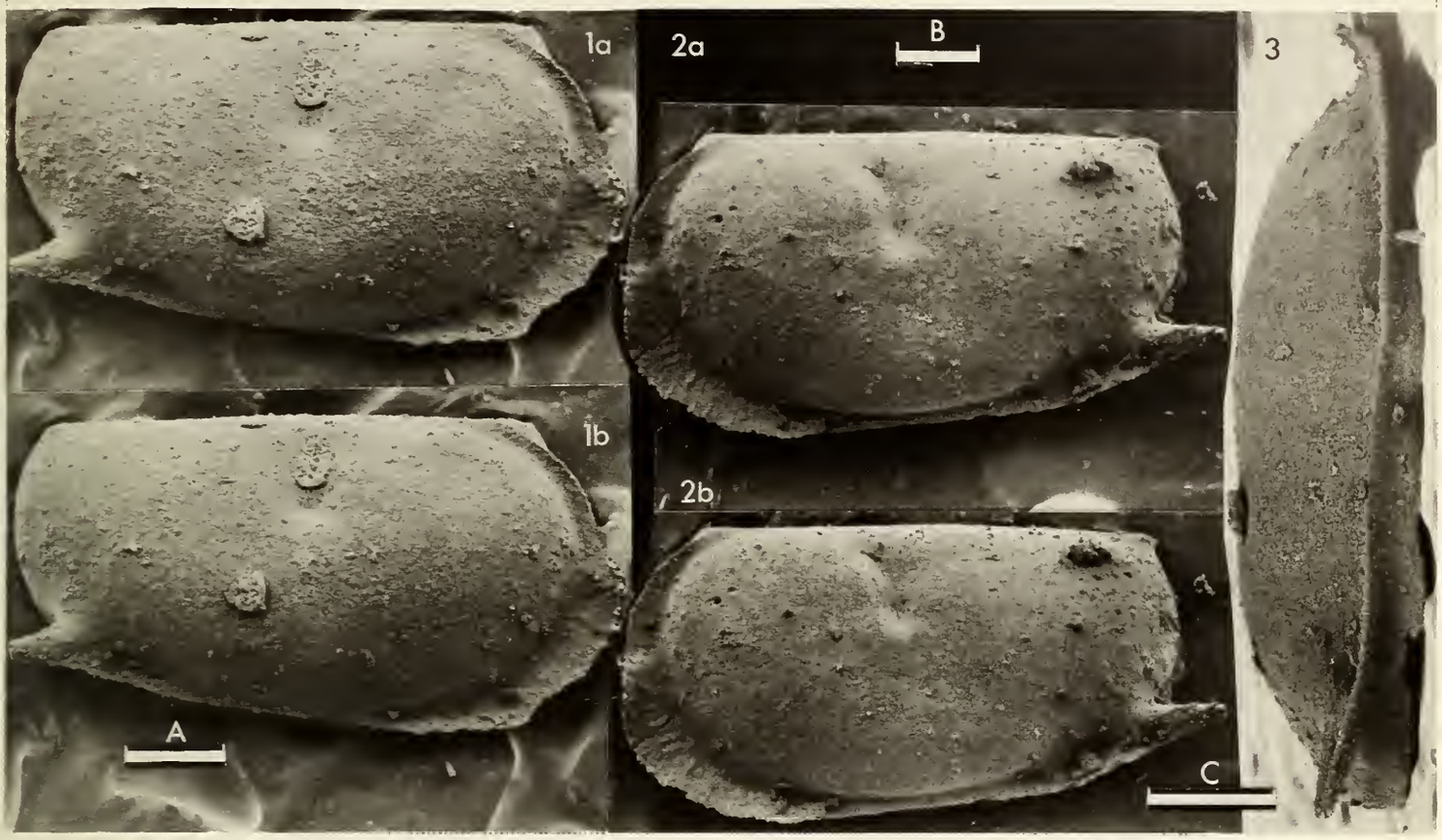
Remarks: The type-species, *Eographiodactylus eos* Kraft (*Mem. geol. Soc. Am.*, **86**, 62, 1962), lacks a well developed sulcus but has a faint depression dorsal of, and slightly anterior to, valve centre and an internal muscle attachment ridge (sulcament) marking the position of the external depressed area. Furthermore, the adventral structure in *E. eos* terminates in the anterocentral region, where it forms a second spine-like process.

Eographiodactylus hyatti Copeland (*Geol. Surv. Can. Pap.*, **72** (43), 24, 1973) is distinguished mainly by its reticulate shell. Its adventral structure does not form a spur or spine anteriorly and runs parallel to free margin throughout its length, S2 is developed only as a shallow depression, and the marginal ridge is relatively strong. In *Eographiodactylus billingsi* Copeland (*Bull. geol. Surv. Can.*, **187**, 19, 1970) the main adventral structure also runs more or less parallel to the ventral free margin; posteroventrally it supports a small spine, anteriorly it does not form a cusp or spine. Its marginal ridge is very distinct and is larger in the right valve. *E. sulcatus* is the only species of the genus known from Europe. *E. eos* occurs in the Middle Ordovician of the U.S.A., *E. hyatti* and *E. billingsi* in the Upper Ordovician of Canada.

The main adventral structure of *Eographiodactylus* was called a "velate frill" by Kraft (*op cit.*, 63). Copeland (1973, 25) also considered this structure to be a velate ridge whereas Schallreuter (*op. cit.*, 280) questioned its velar nature. The structure in question cannot, however, be considered a marginal sculpture: in *E. sulcatus* it diverges from the free margin and normally a marginal sculpture runs parallel beside or at the free margin. Kraft (*op. cit.*) does not mention a marginal sculpture in the type species, whereas in *E. sulcatus* there is a very faint marginal ridge (Pl. 7, 8, fig. 4), and in *E. hyatti* and especially in *E. billingsi* it is very distinct. It could be, therefore, that the main adventral sculpture of *Eographiodactylus* is a velum but at present it is difficult to decide whether it is homologous with the palaeocope velum. In the Quasillitinae, Adamczak (*Senckenberg. leth.*, **57** (4/6), 360, 1976) calls the feature a marginal ridge; however, if this ridge is homologous with the main adventral structure (velum?) of *Eographiodactylus*, his terminology would be incorrect.

Explanation of Plate 7, 4

Figs. 1, 3, LV (**GPIH 2214**, 585 μm long without spine): fig. 1, ext. lat.; fig. 3, ext. vent. Fig. 2, larval LV, ext. lat. (**GPIH 2215**, 406 μm long without spine).
Scale A (100 μm; x 140), fig. 1; scale B (100 μm; x 185), fig. 2; scale C (100 μm; x 175), fig. 3.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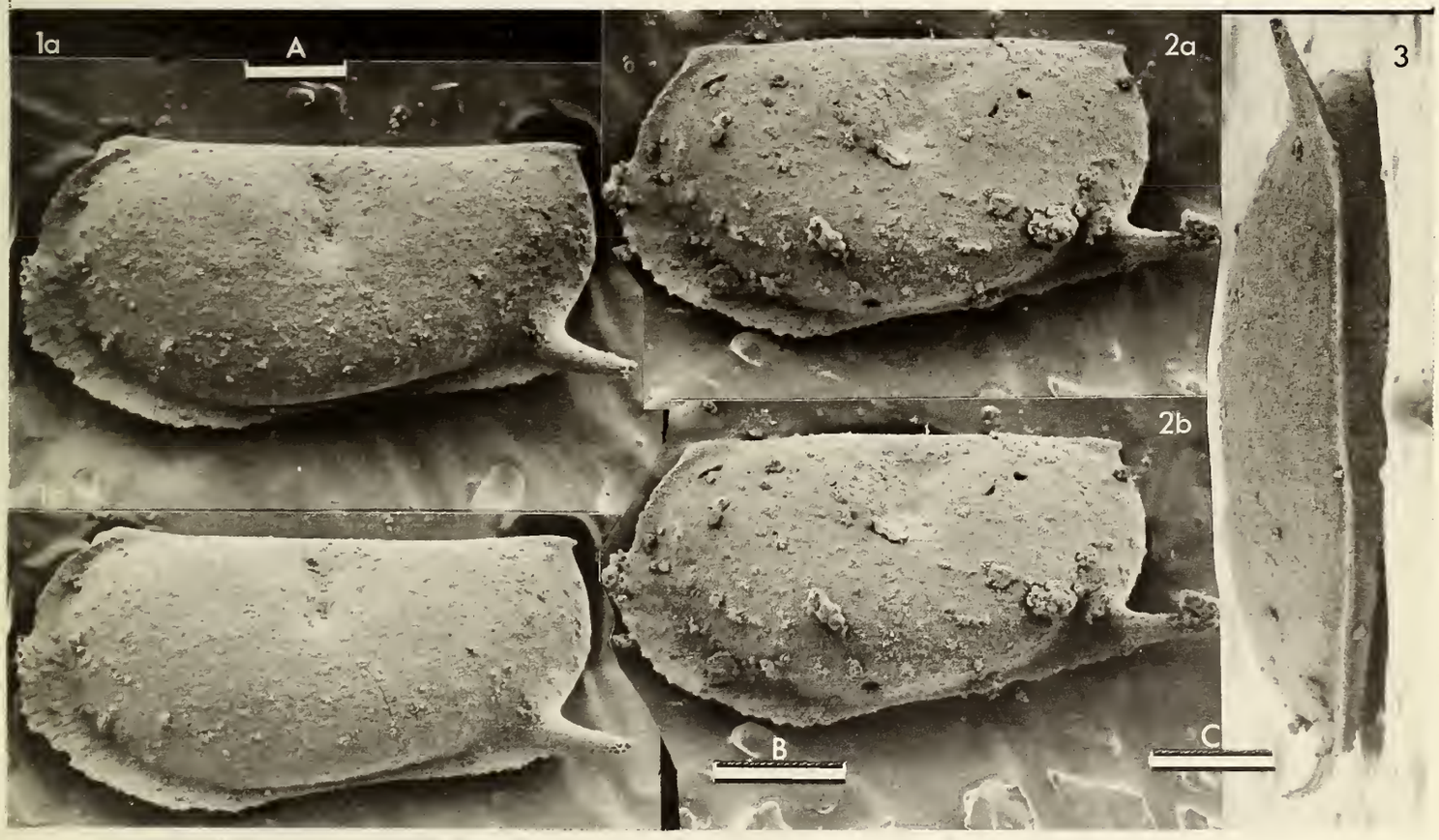
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Remarks: (cont'd.) Kraft (*op. cit.*, 62) tentatively placed *Eographiodactylus* in the questionable family Quasillitidae. He also noted that the genus *Graphiadactyllis* Roth, 1929 is similar and that "there is little doubt that *Eographiodactylus* is the root stock from which *Graphiadactyllis* and the closely related Quasillites developed". Kellett (*Micropalaeontology*, **9** (2), 229, 1963) also thought *Eographiodactylus* "a distinctive, truly quasillitid-graphiadactyllid ostracod, ancenstral to a group common in the Middle Devonian". Adamczak (*op. cit.*, 359 - 361) considered the latter ostracod group as a subfamily of the Thlipsuridae, Thlipsuracea, suborder Metacopa, but he did not mention *Eographiodactylus* as a member of the Quasillitinae.

The familial assignment of *Eographiodactylus* is difficult to decide at present. Perhaps the genus represents a separate family or subfamily. Its relationship to the Quasillitinae is expressed mainly by the form of the main adventral structure. The type-species, *Quasillites*, for example, also possesses at the anterior border a cusp or frill, or both, and also a large posteroventral spine (Peterson, *J. Paleont.*, **38** (5), 846, 847, 1964), but the spine is not a part of the main adventral structure as in *Eographiodactylus* (Kesling *et al.*, *Contr. Mus. Paleont. Univ. Mich.*, **15** (2), pl. 2, fig. 2, 1959). Similarity also exists in minor features such as reticulation (cf. Peterson, *op. cit.*, pl. 135, figs. 8, 9 and Copeland, *op. cit.*, pl. 4, figs. 18, 19). In its velum-like adventral structure *Eographiodactylus* also resembles *Leptoprimitia* Kummerow, 1953 and *Zeuschnerina* Adamczak, 1976, both (Adamczak *op. cit.*, 379) externally well differentiated ropolenellids which have "evolved presumably from *Ropolonellus*-like forms by developing a velum-like marginal structure. . ."

Explanation of Plate 7, 6

Fig. 1, posterovent. incomplete RV, int. lat. (**GPIH 2216**, 610 μm long); fig. 2, LV, int. vent. obl. (**GPIH 2217**, 649 μm long); fig. 3, LV, ext. ant. obl. (**GPIH 2214**); fig. 4, larval LV, ext. vent. (**GPIH 2215**).
Scale A (100 μm; x 140), fig. 1; scale B (100 μm; x 130), fig. 2; scale C (100 μm; x 190), fig. 3; scale D (100 μm; x 200), fig. 4.

Remarks: (cont'd.) The hinge in *Eographiodactylus* is long, straight and undivided whereas in typical Quasillitinae it is shorter, convex and tripartite (for example, see Adamczak, *op. cit.*, text-fig. 42, pl. 20, fig. 127a). According to Kellett *(op. cit.)* "This is not surprising, as a shortening of the hinge is an evolutionary trend characteristic of the Ostracoda". This trend also occurs, for example, in the Kloedenellacea (Guber & Jaanusson, *Bull. geol. Instn. Univ. Upsala*, **42**, 2, 1965 = *Publ. Palaeont. Instn. Univ. Upsala*, **53**, 4, 1964); it is long and straight in the Ordovician monotiopleurids, short and convex in the younger kloedenellids (*op. cit.*, text-figs. 2C-F).

The Metacopa are defined by Adamczak (*op. cit.*, 358) as "medium sized podocopids without duplicature". According to Kraft (*op. cit.*, 62) *Eographiodactylus* lacks the (narrow) inner lamella noted (Swain, *J. Paleo*, **27** (2), 270, 1953) in *Graphiadactyllus*. *E. sulcatus* has a small, entirely fused inner lamella (Pl. 7, 6, fig. 2). Perhaps this is also, like the long straight hinge-line, a primitive feature. In the Bairdiocyprididae – considered (Adamczak *op. cit.*, 319) to be a very simple group of podocopes and possible ancestors of the Metacopa – a thin inner lamella is also present (Adamczak, *op. cit.*, pl. 1, fig. 1f).

A special feature of *Eographiodactylus* is the R/LV-overlap. Both, *E. eos* and *E. sulcatus* have a contact-groove in the right valve to receive the overlapped margin of the left valve (Kraft, *op. cit.*, 63, pl. 16, fig. 7a; herein Pl. 7, 6, fig. 1). In the Quasillitinae and the Ropolonellidae the left valve is larger. Also in many other Ordovician Metacopa with two stop-pegs the left valve is the larger valve.

Distribution: Öjlemyrflint erratic boulders of the Isle of Gotland (Baltic Sea) and of the Kaolinsand (Pliocene-Pleistocene) of the Isle of Sylt (N Sea); Upper Ordovician.

Explanation of Plate 7, 8

Figs. 1 - 3, LV (**GPIH 2217**): fig. 1, int. lat.; fig. 2, int. vent. obl.; fig. 3, ext. vent. Fig. 4, LV, ext. anterovent. (**GPIH 2213**).
Scale A (100 μm; x 130), figs. 1, 2; scale B (100 μm; x 160), fig. 3; scale C (100 μm; x 150), fig. 4.


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1b
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Stereo-Atlas of Ostracod Shells 7 (2) 9 - 16 **(1980)**
595.336.12 (113.312) (430.2:161.013.54) : 551.35 + 552.54

ON *KLIMPHORES PLANUS* SCHALLREUTER

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Genus *KLIMPHORES* Schallreuter, 1966

Type-species (by original designation): *Klimphores planus* Schallreuter, 1966

Diagnosis: Small (normally <1mm long) palaeocopes, more or less amplete. Pair of convex, oblong nodes occur offset towards anterior end, mainly in dorsal half of valve; anterior node extended, lobe-like anteroventrally; preadductorial node totally or almost totally incorporated in anterior node. Border between lateral and marginal surface (pseudovelum) forms simple and sometimes prominent bend, ridge-like keel or bend with row of spines. Lateral surface, including nodes, may be punctate or reticulate; base of lumina may have sieve-pores.

Explanation of Plate 7, 10

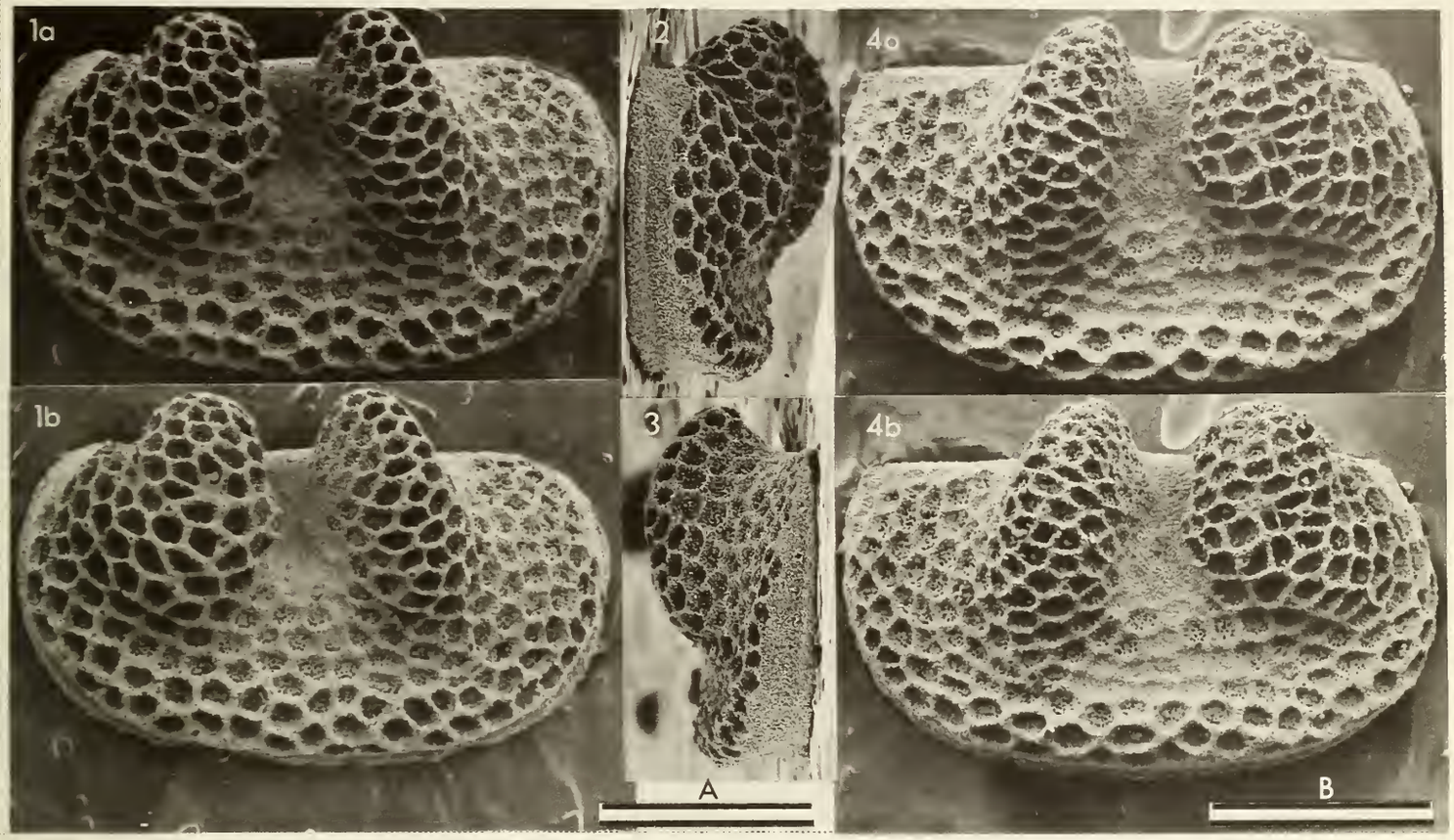
Figs. 1 - 3, LV (**GPIH 2229**, 692 μm long): fig. 1, ext. lat.; fig. 2, ext. ant.; fig. 3, ext. post. Fig. 4, RV, ext. lat. (**GPIH 2230**, 660 μm long).
Scale A (250 μm; x 120), figs. 1 - 3; scale B (250 μm; x 125), fig. 4.

Remarks: *Klimphores* is type-genus of the Binodicopa (Binodicopina). For a list of congeneric species see Schallreuter [*Ber. dt. Ges. geol. wiss.* (A), **11** (3), 394, 1966; *Ibid.*, **14** (2), 199 - 209, 1969], Knüpfer [*Freiberger ForschHft.* ser. C, **234** (*Zur Paläontologie und Biostratigraphie des Palaozoikums und Mesozoikums Europas*, **3**), 6, 1968] and Gailīte [*Palaeontologija i stratigrafija Pribaltiki i Belorussii (Palaeontology and Stratigraphy of the Baltic and Byelorussia)* **3**, 399 - 44, 1971]. *Klimphores ansiensis* Gailīte and *K. bimembris* Gailīte (*op. cit.*) belong to *Laterophores* Schallreuter, 1968 (*Ber. dt. Ges. geol. wiss.*, **13** (2), 248), a genus very similar to, and presumably ancestor of *Klimphores*.

Sieve-pores in Palaeozoic ostracods were first described by Gramm (*Palaeont. ž*, 151 - 54, **1977**), from a Lower Carboniferous *Editia* species. Sieve-pores in Ordovician ostracods were first figured by Schallreuter (*Stereo-Atlas of Ostracod Shells*, **4** (1), 9 - 16, 1977), in *Miehlkella cribroporata* Schallreuter. In the latter the sieve-pores consist of rings of pores, whereas in *Klimphores planus* they form fields of many irregularly arranged pores.

Explanation of Plate 7, 12

Figs. 1, 2, LV (**GPIH 2231**, 683 μm long): fig. 1, int. lat.; fig. 2, int. vent. obl. Fig. 3, RV, ext. vent. (**GPIH 2232**, 685 μm long).
Scale A (250 μm; x 110), figs. 1, 2, scale B (250 μm; x 120), fig. 3.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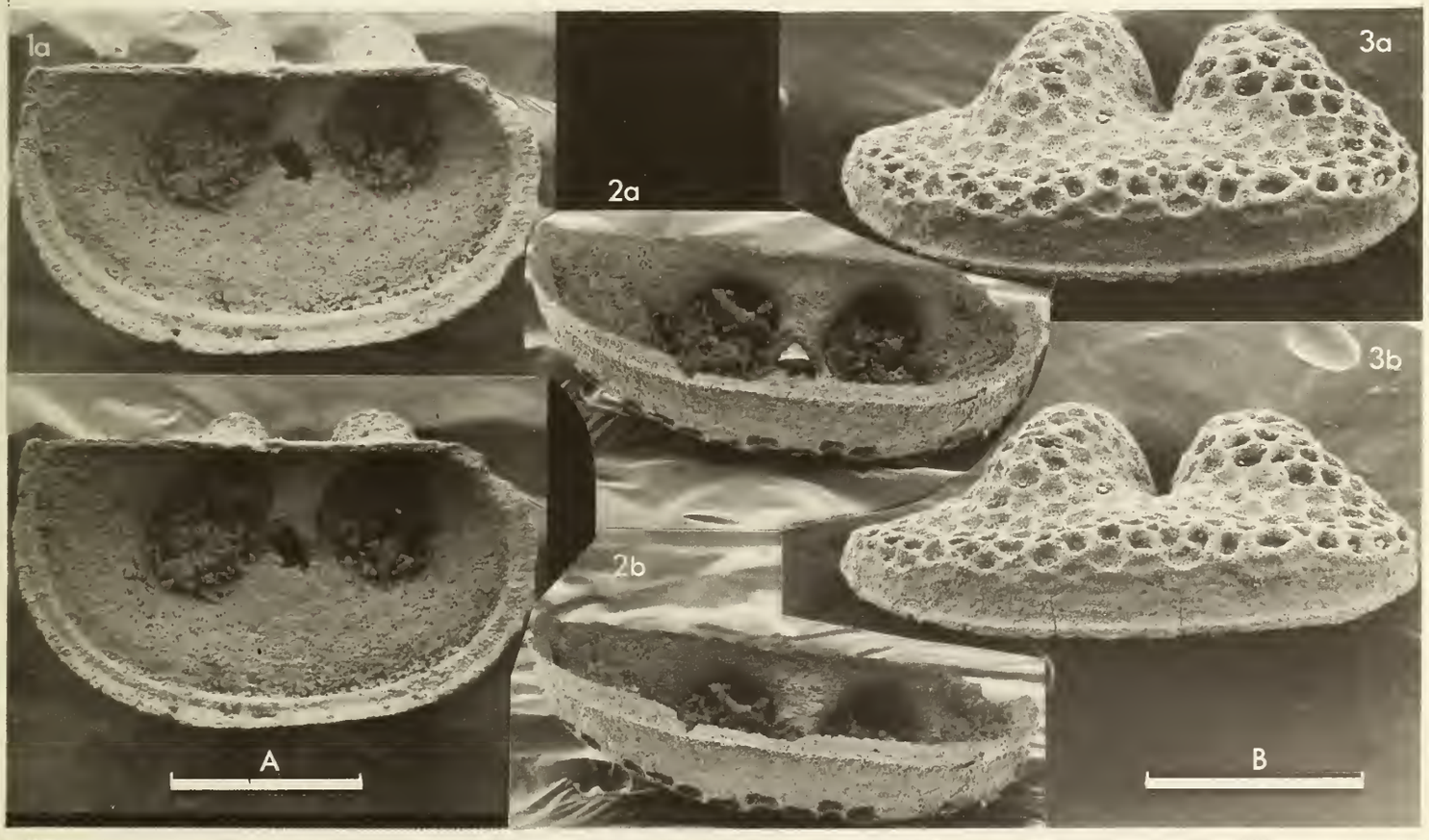
1a
3a
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Klimphores planus Schallreuter, 1966

1966 *Klimphores planus* gen. et sp. nov. R. E. L. Schallreuter, *op. cit.*, 393, 394, 395 - 397, pl. 1, fig. 1.
1969 *Klimphores planus* Schallreuter; R. E. L. Schallreuter, *Geologie,* **18** (3), 344.
1969 *Klimphores planus* Schallreuter; R. E. L. Schallreuter, *Ber, dt. Ges. geol. wiss.,* 199, tab. 5 (208).
1970 *Klimphores planus;* R. E. L. Schallreuter, *Hercynia N. F.,* **6** (1969) (3), tab. 2 (294/295).
1971 *Klimphores planus* Schallreuter; L. K. Gailite, *op. cit.,* 38, 42, 43.
1973 *Klimphores planus* Schallreuter; W. Neben & H. H. Krueger, *Staringia,* **2** (= Bijvoegsel van Grondboor en hamer, **6**), pl. 95, fig. 7 (= Schallreuter 1966, *op. cit.,* pl., fig. 1).
?1973 *Klimphores planus* (Neckaja); N. Sidaravičiene, *Dokl. Akad. Nauk SSSR,* **209** (4), 1183.

Holotype: Department of Geological Sciences, University of Greifswald, German Democratic Republic, no. **18/1**, RV.

Type locality: Beach at Dornbusch, Isle of Hiddensee (Baltic Sea); lat. 54° 36' N, long. 13° 7' E. Backsteinkalk erratic boulder (1B1 Type, boulder no. 1B4), Middle Ordovician.

Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg (GPIH) nos. **2229** (LV: Pl. **7**, 10, figs. 1 - 3; Pl. **7**, 14, figs. 3, 4; Pl. **7**, 16, fig. 3), **2230** (RV: Pl. **7**, 10, fig. 4), **2231** (LV: Pl. **7**, 12, figs. 1, 2), **2232** (RV: Pl. **7**, 12, fig. 3), **2233** (RV: Pl. **7**, 14, figs. 1, 2; Pl. **7**, 16, fig. 4), **2234** (LV: Pl. **7**, 16, figs. 1, 2). All from Backsteinkalk erratic boulder no. 1B1 from the beach at Dornbusch, Isle of Hiddensee (Baltic Sea); lat. 54° 36' N, long. 13° 7' E; Middle Ordovician; coll. by the author in 1961.

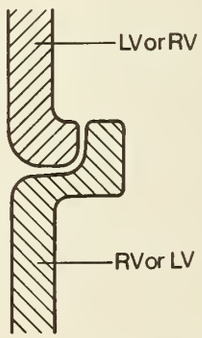
Explanation of Plate 7, 14

Figs. 1, 2, RV (**GPIH** 2233, 673 μm long): fig. 1, int. lat.; fig. 2, int. vent. obl. Figs. 3, 4, LV (**GPIH 2229**): fig. 3, ext. vent.; fig. 4, ext. lat., detail.
Scale A (250 μm; x 110), figs. 1 - 3; scale B (50 μm; x 380), fig. 4.

Diagnosis: Anterior cardinal corner more or less rounded, posterior corner more distinct and acute. Hinge-line straight, rather long. Lateral surface below sulcus relatively flat. Nodes oblong, subparallel, considerably extended beyond hinge-line, with narrowing, rounded peaks; ventrally relatively distinct from remaining lateral surface. Anteroventral inflation of anterior node well developed, almost reaching anterior valve margin, not very distinctly separated from node itself. Pseudovelum forms prominent bend. Reticulation moderately coarse, lumina with sieve-pores. Length up to 0.71mm; length/height ratio, 1.65 - 1.85.

Remarks: As shown by the specimens in Pl. **7**, 12, fig. 1 and Pl. **7**, 14, fig. 1 reversal of overlap seems to occur in this species. The structures of the contact margin protrude outwards over the plane of the marginal surface (Text-fig. 1; Pl. **7**, 12, fig. 2; Pl. **7**, 14, fig. 2; Pl. **7**, 16, fig. 2).

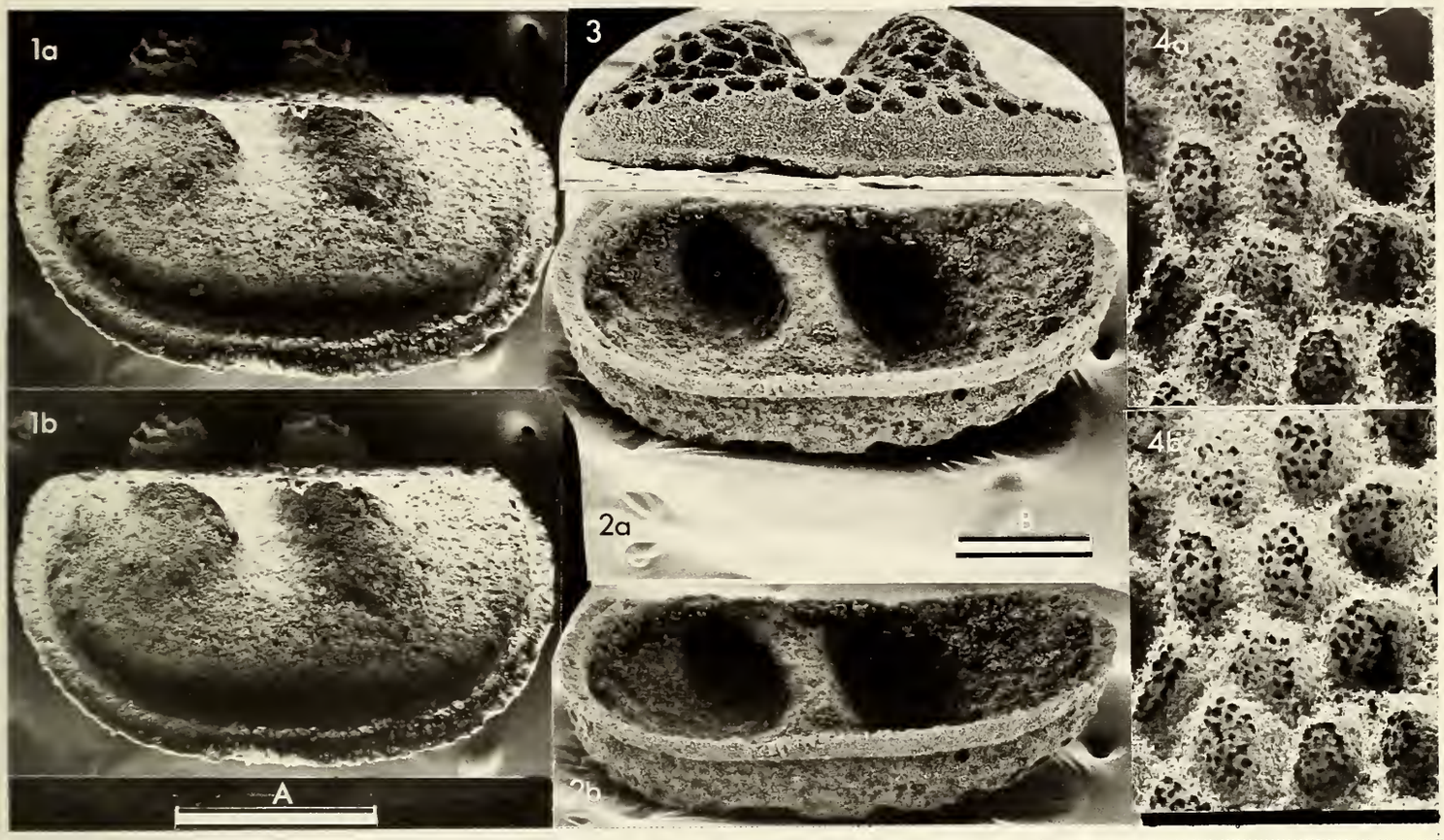
Distribution: Backsteinkalk erratic boulders of northern Germany (1B1, 1B2, 1B3, 1B14 Types), lower Upper Viruan (Middle Ordovician).



Text-fig. 1. Overlap conditions in *Klimphores planus.*

Explanation of Plate 7, 16

Figs. 1, 2, LV (**GPIH** 2234, 642 μm long): fig. 1, int. lat.; fig. 2, int. vent. obl. Fig. 3, LV, ext. dors. (**GPIH 2229**); fig. 4, RV, int. lat., detail (**GPIH** 2233).
Scale A (250 μm; x 110), figs. 1 - 3; scale B (50 μm; x 320), fig. 4.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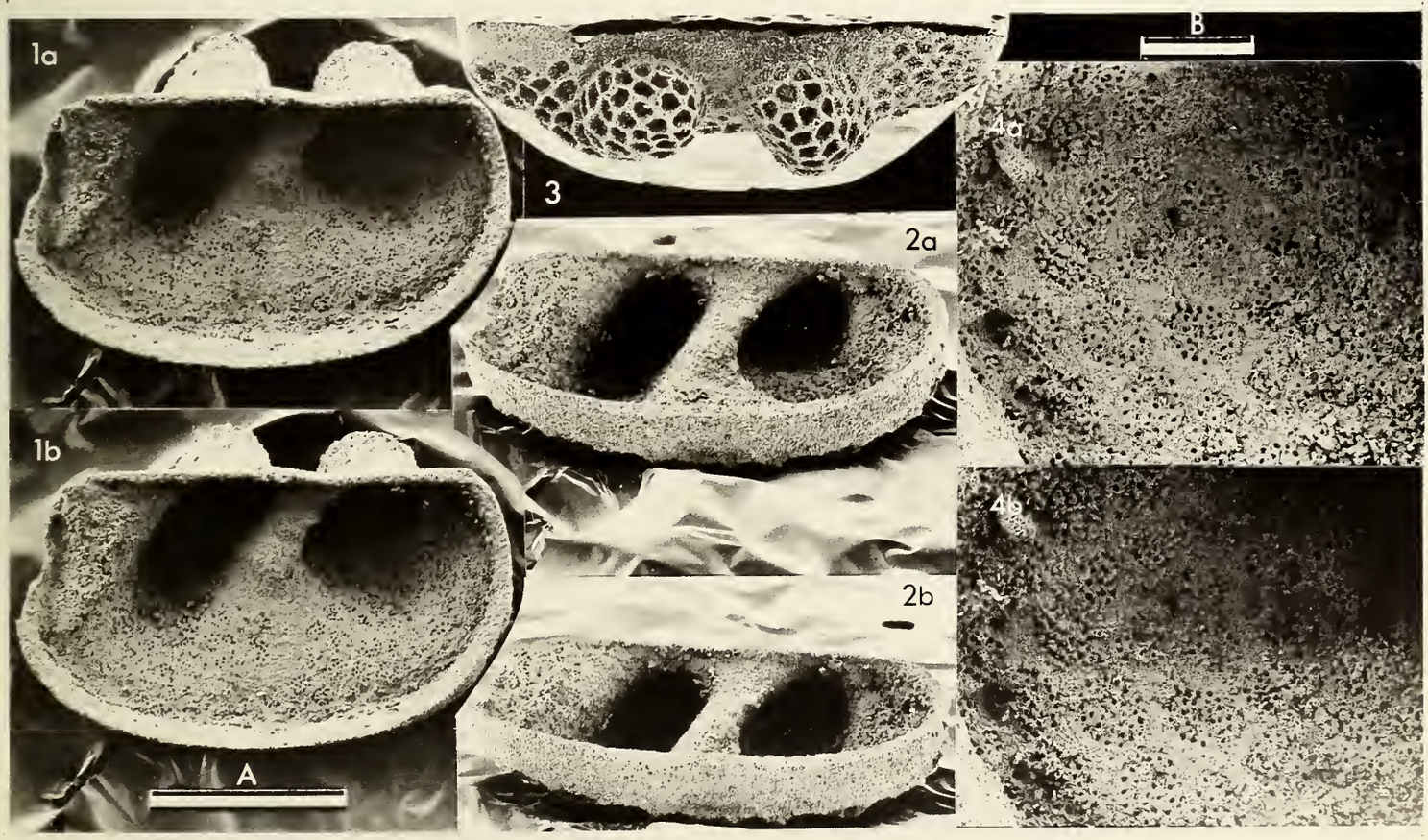
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595.336.13 (113.31) (486:161.018.57 + 492.71 : 161.008.54) : 551.35 + 552.55

ON *FORAMENELLA PARKIS* (NECKAJA)

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Genus *FORAMENELLA* Stumbur, 1956

Type-species (by original designation): *Euprimitia parkis* Neckaja, 1952

Diagnosis: A genus of Perspicillinae; unisulcate, sulcus deep but narrow; no special lobal features; no distinct adventral sculptures except for the 5 loculi in the female valve.

Remarks: Stumbur *(Tartu Riikliku Ülik. Toim.,* **42**, 187, 1956) designated *Euprimitia parkis* Neckaja as the type-species of *Foramenella.* Because Sarv (*Eesti NSV Tead. Akad. Geol. Inst. uurimused*, **4**, 154, 1959) considered that *F. parkis* of Stumbur was not conspecific with Neckaja's species he introduced the new species *'Foramenella porkuniensis* nom. nov.' for Stumbur's material although the term 'nomen novum' was in error. If Sarv is correct in regarding Stumbur's material distinct from *E. parkis* Neckaja then we have a "Misidentified type-species" (ICZN article 70a) and a case for the commission. It is not certain, however, that *F. porkuniensis* represents a separate species (see below); Stumbur was probably correct and *F. porkuniensis* should therefore be regarded as a junior subjective synonym. *Foramenella* ? *phippsi* Copeland (*Geol. Surv. Can. Pap.,* **72** (43), 14, 1973) differs so strongly from *F. parkis* and *F. porkuniensis* that its assignment to the genus is very doubtful and is not considered in the diagnosis.

Explanation of Plate 7, 18

Figs. 1, 2, ♀ LV (**GPIH 2218**, 951 μm long): fig. 1, ext. lat.; fig. 2, ext. anterovent. obl.; fig. 3, ♀ LV, int. lat. (**GPIH 2219**, 868 μm long).
Scale A (250 μm; x 84), fig. 1; scale B (250 μm; x 70), fig. 2; scale C (250 μm; x 80), fig. 3.

Foramenella parkis (Neckaja, 1952)

1952 *Euprimitia parkis* sp. nov. A. I. Neckaja, *Trudy vses neft, naucno-issled. geol. -razv. Inst.* (VNIGRI), **60** (= *Microfauna SSSR,* **5**), 217, 221, 231, pl. 2, fig. 4.
1956 *Foramenella parkis* (Neckaja); K. Stumbur, *op. cit.,* 187, 188, 194, pl. 1, figs. 4 - 11.
1960 *Foramenella parkis* (Neckaja); L. I. Sarv, *Eesti NSV Tead. Akad. Geol. Inst. uurimused,* **5**, 242, tab. 1.
1962 *Foramenella porkuniensis* Sarv; L. I. Sarv. *Eesti NSV Tead. Akad. Geol. Inst. uurimused,* **6**, 96, 119, 120, tab. 1, pl. 5, figs. 6 - 10.
1972 *Foramenella parkis* Neckaja; L. Gailite, *Regional 'naja geologija Pribaltiki i Belorussii,* **5**, 5, fig. 2.

Holotype: VNIGRI, Leningrad, no. **17 - 157**, ♀ LV. Neckaja (1952) designated this holotype, but Stumbur (*op. cit.,* 187, 194) also designated a 'lectotype' from Porkuni material, Estonia.

Type locality: Near Vilnius, Lithuania; approx. lat. 54° 40' N, long. 25° 20' E. Lyckholm (Saaremyjza) Beds (F_1), Ordovician.

Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg (GPIH) nos. **2218** (♀ LV: Pl. 7, 18, figs. 1, 2; Pl. 7, 20, fig. 4), **2219** (♀ LV: Pl. 7, 18, fig. 3), **2220** (♀ LV: Pl. 7, 20, fig. 1), **2221** (larval tecnomorphic RV: Pl. 7, 20, figs. 2, 3). Specimen **2218** is from the Öjlemyrflint erratic boulder no. Sy60, from the Kaolinsand (Pliocene-Pleistocene) of Braderup, Isle of Sylt (N Frisian Is., N Sea), Germany; lat. 54° 56' N, long. 8° 21' E; coll. by Ulrich von Hacht in 1978. Specimens **2219 - 2221** are from the Ojlemyrflint erratic boulder no. G30 from the beach opposite the Isle of Lilla Karlsö, Isle of Gotland (Baltic Sea), Sweden; lat. 57° 18'N, long. 18°8'E; coll. by the author in 1976.

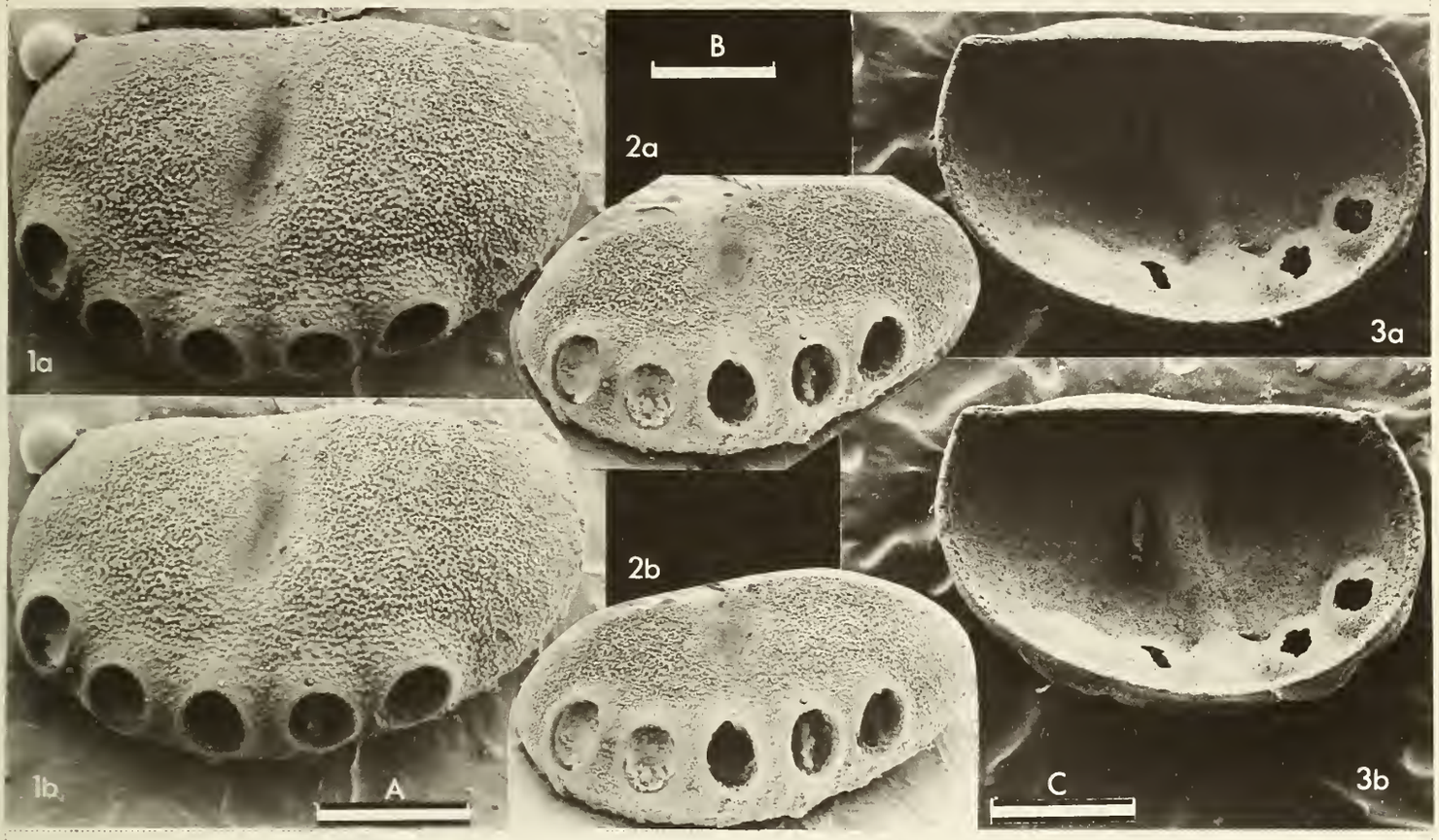
Diagnosis: As for the genus

Remarks: According to Sarv (*op. cit.* 119, 1962) *Foramenella porkuniensis* is distinguished from *F. parkis* by its strongly convex valves, its narrow, deep S2, and in having relatively well separated loculi. The new material (herein) shows variation in length (♀ valves = 0.83 – 0.95mm; holotype of *F. parkis* = 0.80mm, that of *F. porkuniensis* = 0.97mm) and surface ornamentation [nearly smooth, as recorded from *F. porkuniensis* (Sarv, *op. cit.* 119, 1962) or reticulo-granulated, as recorded from *F. parkis* (Neckaja, *op. cit.*)].

Distribution: Recorded from the Rakvere Stage (E) and lower part of the Nabala and Vormsi stages (F_1a + b) of Latvia (Gailite 1972), the Lyckholm (Saaremyjza) Beds (F_1) of Lithuania (Neckaja 1952) and the Pirgu Stage (F_1c) of Estonia (Sarv 1959). The conspecific *F. porkuniensis* is known only from the Porkuni Stage (F_2) of Estonia (Sarv 1962).
Recorded herein from the Öjlemyrflint erratic boulders of the Isle of the Gotland (Baltic Sea) and the Kaolinsand Pliocene-Pleistocene) of the Isle of Sylt (N Frisian Is., N Sea).

Explanation of Plate 7, 20

Fig. 1, ♀ LV, ext. lat. (**GPIH 2220**, 886 μm long); figs. 2, 3, larval tecnomorphic RV (**GPIH 2221**, 734 μm long): fig. 2, ext. vent.; fig. 3, ext. lat.; fig. 4, ♀ LV, ext. lat., detail of surface ornamentation (**GPIH 2218**).
Scale A (250 μm; x 90), fig. 1; scale B (250 μm; x 100), figs. 2, 3; scale C (50 μm; x 300), fig. 4.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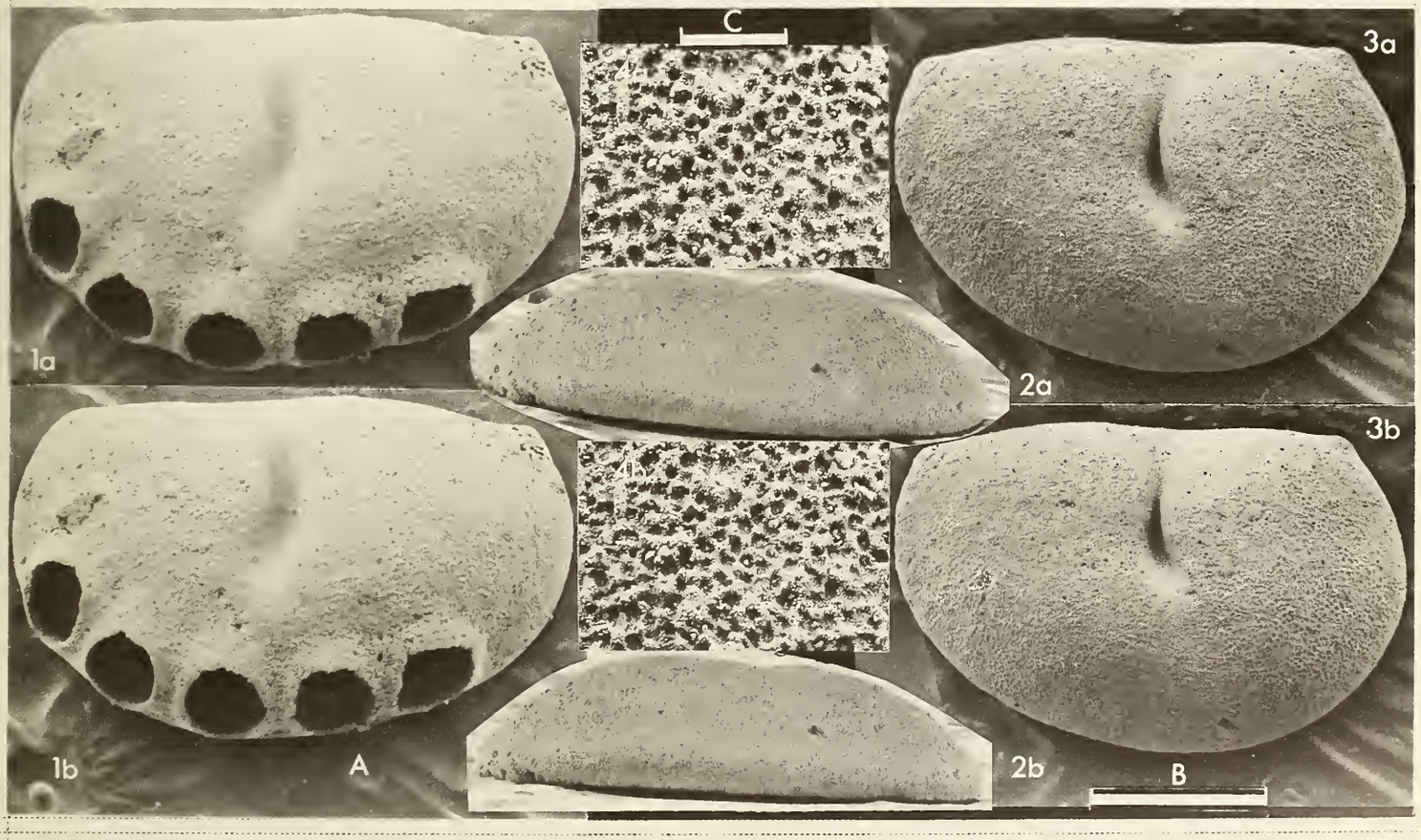
C
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Stereo-Atlas of Ostracod Shells 7 (4) 21 - 24 **(1980)**
595.336.13 (113.313) (492.71:161.008.54) : 551.35 + 552.55

ON *DISULCINA SYLTENSIS* SCHALLREUTER sp. nov.

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Disulcina syltensis sp. nov.

Holotype: Geologisch-Paläontologisches Institut, University of Hamburg (GPIH) no. 2225, ♀ RV.

Type locality: Middle Ordovician Hornstein erratic boulder no. Sy 52 of the Kaolinsand (Pliocene-Pleistocene), near Braderup, Isle of Sylt (N Frisian Is., N Sea), Germany; lat. 54° 56' N, long 8° 21' E.

Derivation of name: After the type locality, the Isle of Sylt.

Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg (GPIH) nos. **2226** (♀ LV: Pl. 7, 22, fig. 1), **2225** (holotype, ♀ RV: Pl. 7, 22, fig. 2), **2227** (♂ LV: Pl. 7, 22, fig. 3; Pl. 7, 24, fig. 4), **2228** (♀ RV: Pl. 7, 24, figs. 1 - 3). All the figured specimens are from Hornstein erratic boulder no. Sy 52 (see type locality above); coll. by Ulrich von Hacht in 1978.

Explanation of Plate 7, 22

Fig. 1, ♀ LV, ext. lat. (**GPIH 2226**, 473 μm long); fig. 2, ♀ RV, ext. lat. (holotype, **GPIH 2225**, 450 μm long); fig. 3, ♀ LV, ext. ant. obl. (**GPIH 2227**, 465 μm long).
Scale A (100 μm; x 160), fig. 1; scale B (100 μm; x 180), fig. 2; scale C (100 μm; x 140), fig. 3.

Diagnosis: Adult ♀ 0.45 - 0.54mm long. Sulcus (S2) developed as a cavum, external slit of which is bow-like, parallel to ventral margin, and slightly constricted anteriorly by small rounded projection. Posteroventral lobe indistinct, expressed only by short spine in posteroventral region slightly above end of velum.

Remarks: In *Disulcina interminata* Sarv (*Eesti NSV Tead. Akad. Geol. Inst. uurimused,* **4**, 146, 1959) the cavum is more steeply inclined to the hinge-line and the edge of its slit-like opening bears short spines. The termination of the posteroventral lobe is similar in both *D. syltensis* and *D. intermedia* but in the latter the velum passes around the end of the posteroventral lobe forming a fissum behind the lobe. A second fissum may occur anteroventrally of S2.

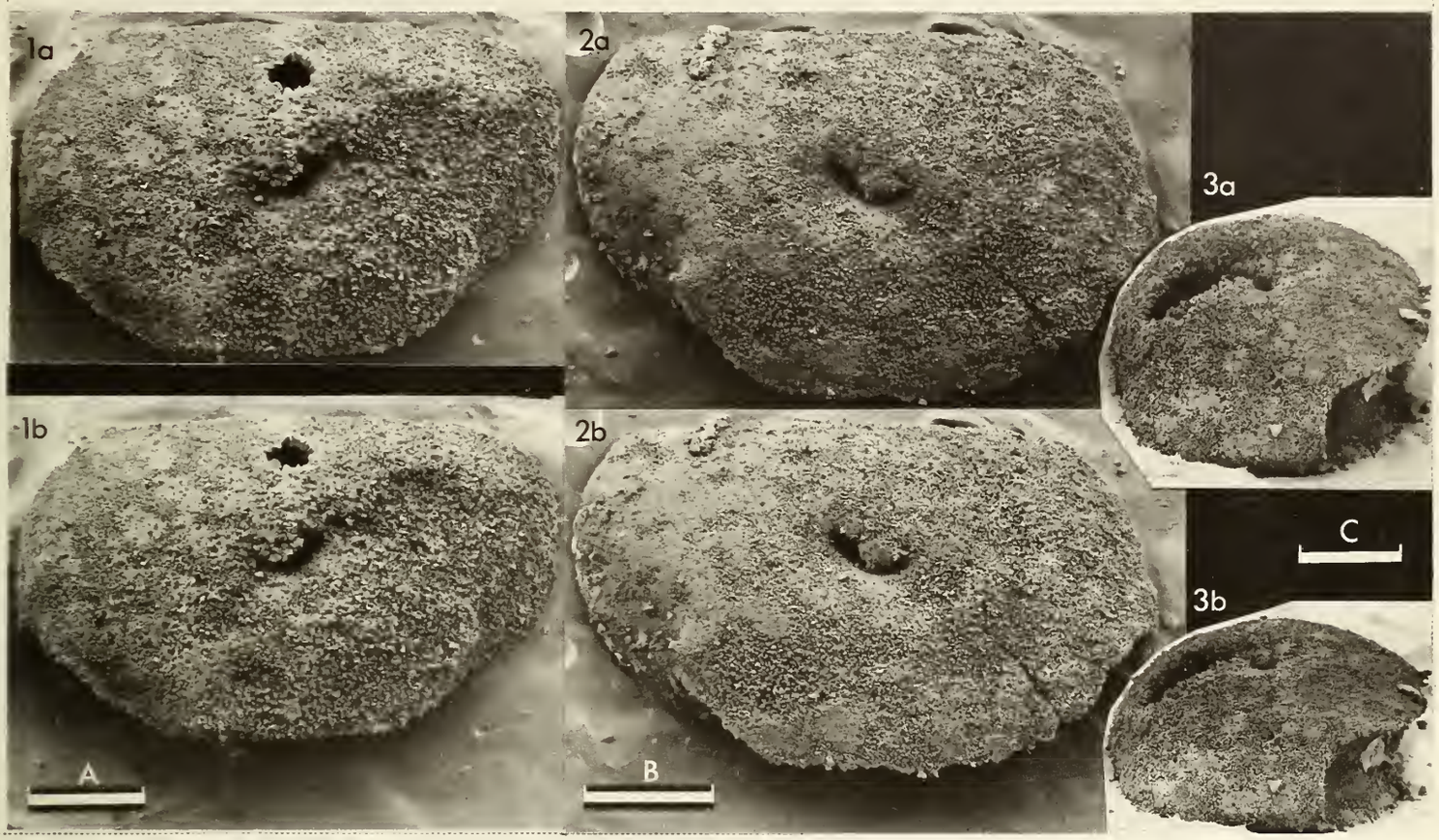
In the type-species of *Disulcina* Sarv, 1959, *D. perita* (Sarv, *Ibid.*, **1**, 37, 1956), the slit of the cavum is even more steeply inclined to the hinge-line and apparently longer (Sarv *op. cit.*, 1959, pl. 26, figs. 6 - 9). Furthermore, this species possesses a long, distinct furrow (not sulcus!) behind the posteroventral lobe.

Pl. 7, 24, fig. 2 shows faint hemispherical depressions in the admarginal 'botulate' antrum, evidently representing orimentary loculi; similar structures are found in *Triemilomatella prisca* Jaanusson & Martinsson from the Silurian of Gotland (*Bull. geol. Instn. Univ. Upsala,* **36** (4) = *Publ. Palaeont. Inst. Univ. Upsala,* **13**, 1956). The new species is an example of a transition stage between a botulate and a loculate antrum. It is a further proof that the practice of separating higher family units using only the loculate or botulate nature of the antral dimorphism is ill-advised (cf. Henningsmoen, *Geol. För. Stockh. Förh.,* **86** (4), (for 1964), 386, 1965, Schallreuter; *Geologie,* **15** (7), 846, 1966 and *Revta esp. Micropaleont.*, **6** (2), 163, 1974).

Distribution: Lower Upper Viruan Hornstein erratic boulders of the Kaolinsand (Pliocene-Pleistocene) near Braderup, Isle of Sylt (N Sea, Germany).

Explanation of Plate 7, 24

Figs. 1 - 3, ♀ RV (**GPIH 2228**, 439 μm long): fig. 1, int. lat. (inner wall and dorsal outer wall of the cavum partly broken away); fig. 2, int. ant. obl.; fig. 3, int. vent. obl. Fig. 4, ♀ LV, ext. anterovent. obl. (**GPIH 2227**).
Scale A (100 μm; x 175), fig. 1; scale B (100 μm; x 185), fig. 2; scale C (100 μm; x 155), fig. 3; scale D (100 μm; x 170), fig. 4.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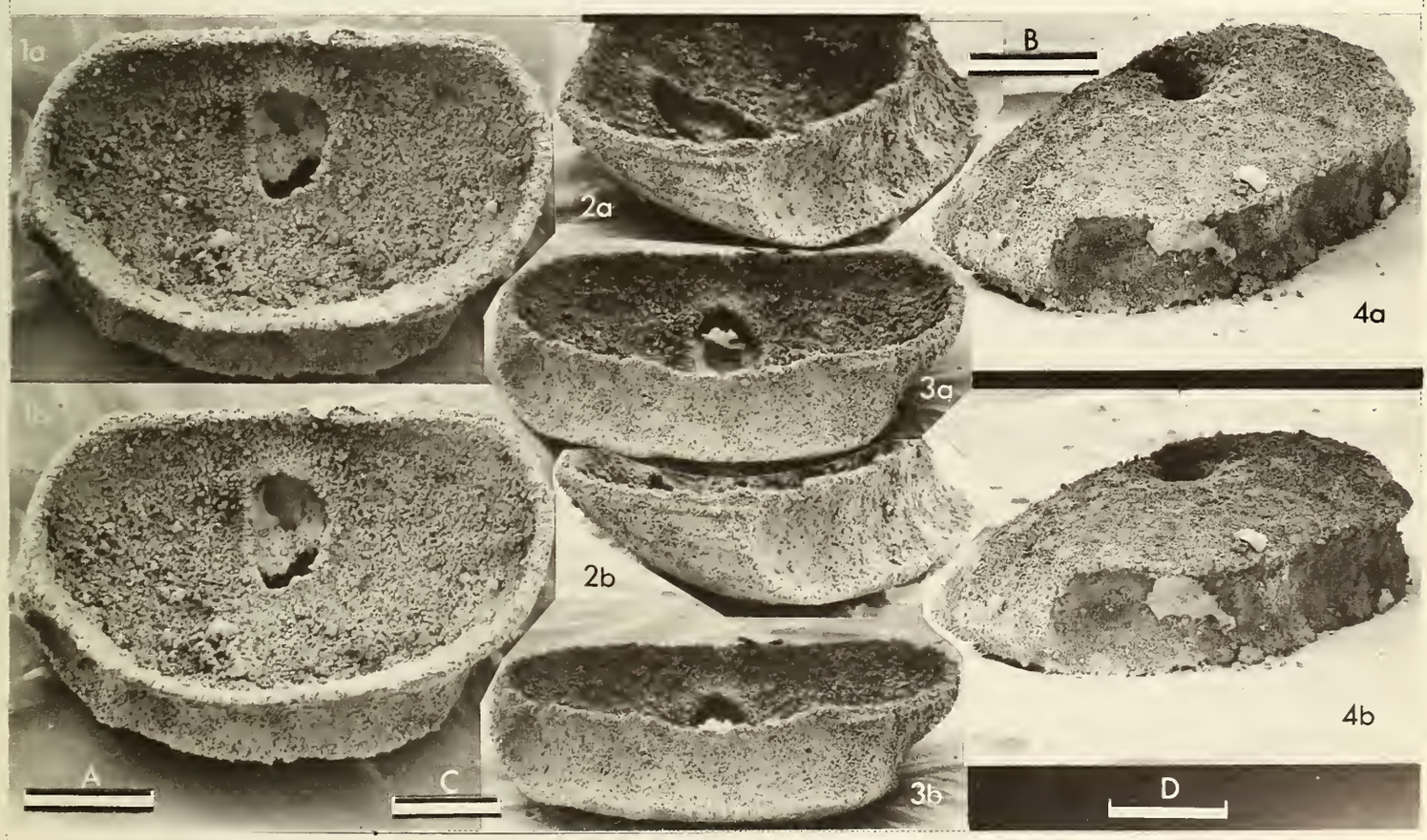
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3b
D

Stereo-Atlas of Ostracod Shells 7 (5) 25 - 28 (1980) *Schuleridea bilobata* (1 of 4)
595.337.14.(116.312)(427.4:162.000.54 + 489:161.010.57 + 430.1:161.010.52) : 551.351 + 552.52

ON *SCHULERIDEA BILOBATA* (TRIEBEL)

by John W. Neale
(University of Hull, England)

Schuleridea bilobata (Triebel, 1938)

1938 *Cytheridea (Haplocytheridea) bilobata* n. sp. E. Triebel, *Senckenbergiana,* **20**, 479, pl. 1, figs. 17 - 20.
1954 *Schuleridea bilobata* (Triebel); E. Triebel, *Senckenberg. leth.,* **35**, 6, pl. 4, figs. 28 - 29.
?1954 *Haplocytheridea bilobata* (Triebel); A. Stchépinsky, *Bull. Soc. geol. France,* (6) 4, 486, text-pl. 2, fig. 12.
1960 *Schuleridea bilobata* (Triebel); J. W. Neale, *Micropaleontology,* **6** (2), 209 - 210, pl. 2, figs. 16a - b, 21.
1963 *Schuleridea bilobata* (Triebel); P. Kaye, *Revue Micropaléont.,* **6**, 31, pl. 2, figs. 1 - 4.
1966 *Schuleridea bilobata* (Triebel); J. Gründel, *Freiberger ForschHft., Paläontologie,* **C.200**, 21, pl. 3, fig. 10.
1969 *Schuleridea bilobata* (Triebel); H. Hiltermann & E. Kemper, *Ber. Naturhist. Ges. Hannover,* **113**, 24 (not figured).
1975 *Schuleridea bilobata* (Triebel); H. Bartenstein & H J. Oertli, *Bull. Centre Rech. Pau – SNPA,* **9** (1), 11, pl. 2, figs. 4 - 6.

Holotype: Senckenberg Museum, Frankfurt am Main, no. **SMF Xe 117a**, ♂ RV.

Type locality: Mittelandkanal near Wenden, N Germany. *Stromecki* Zone, Lower Barremian, Lower Cretaceous.

Explanation of Plate 7, 26

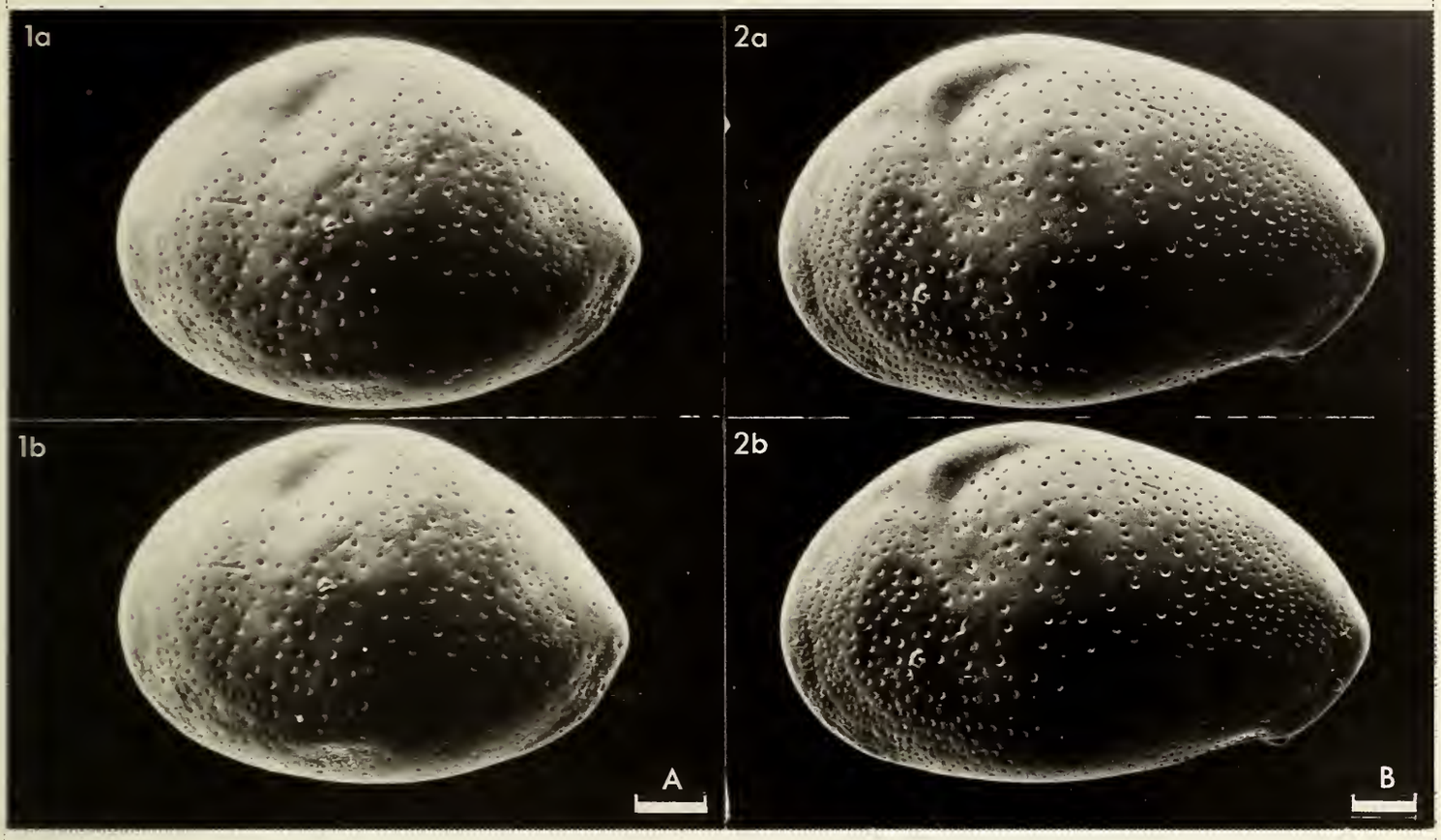
Fig. 1, ♀ LV, ext. lat. (**HU.19.C.14.3**, 800 μm long); fig. 2, ♂ LV, ext. lat. (**HU.19.C.14.1**, 988 μm long).
Scale A (100 μm; x 99), fig. 1; scale B (100 μm; x 86), fig. 2.

Figured specimens: University of Hull coll. nos. **HU.19.C.14.3** (♀ LV: Pl. **7**, 26, fig. 1), **HU.19.C.14.1** (♂ LV: Pl. **7**, 26, fig. 2), **HU.19.C.14.4** (♀ RV: Pl. **7**, 28, fig. 1), **HU.19.C.14.2** (♂ RV: Pl. **7**, 28, fig. 2). All specimens from Middle B. Beds, 1ft. above Cement Bed S, coastal Section, Speeton Clay, Speeton, E Yorkshire, England; lat. 54° 10' N, long. 0° 14' 40" W; Middle Barremian, Lower Cretaceous.

Remarks: This species is easily recognised by the posteroventral lobe or lappet in the presumed male seen in side view. In this it differs from *S. rhomboidalis* (which occurs over the same range) and also in the more strongly pitted surface. Presumed females of *S. bilobata* are more oval than their *S. rhomboidalis* counterparts. *S. bilobata* is well known from the Upper Hauterivian and Barremian of N Germany and N England where associates include *Acrocythere hauteriviana, Apatocythere ellipsoidea, A. simulans, Eucytherura nuda, Protocythere hechti* and *P. triplicata.* It has also been recorded from the Barremian of Nøvling No. 1 well in Central Jutland, Denmark by O. B. Christensen (*Geol. Surv. Denmark III Series,* **40**, 115, 1973).

Explanation of Plate 7, 28

Fig. 1, ♀ RV, ext. lat. (**HU.19.C.14.4**, 756 μm long); fig. 2, ♂ RV, ext. lat. (**HU.19.C.14.2**, 956 μm long).
Scale A (100 μm; x 107), fig. 1; scale B (100 μm; x 93), fig. 2.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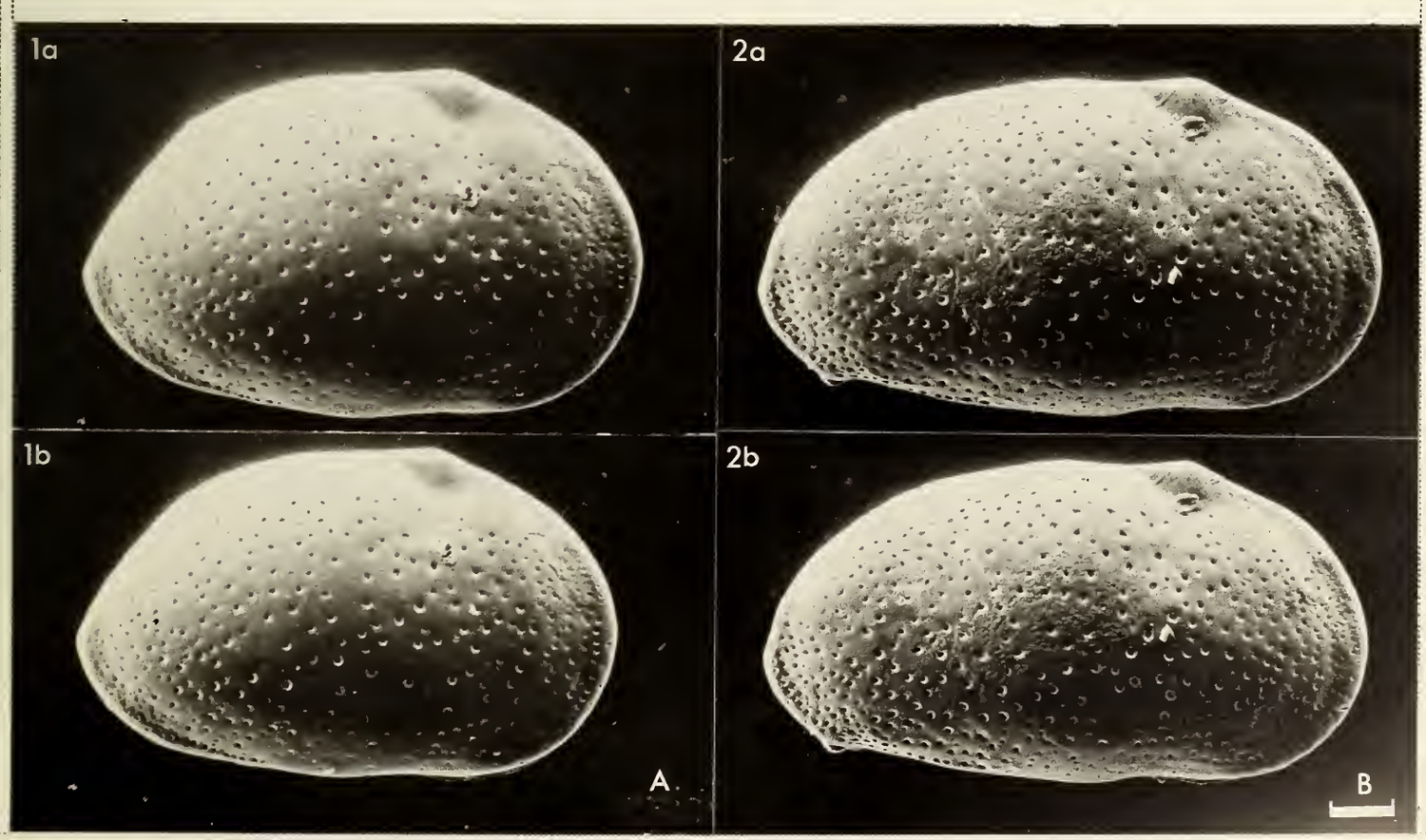
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Stereo-Atlas of Ostracod Shells 7 (6) 29 - 32 (1980)

595.337.14 (116.312) (427.4:162.000.54 + 430.1:161.007.29) : 551.351 + 552.52

ON *SCHULERIDEA RHOMBOIDALIS* NEALE

by John W. Neale
(University of Hull, England)

Schuleridea rhomboidalis Neale, 1960

1960 *Schuleridea rhomboidalis* new species J. W. Neale, *Micropaleontology,* **6** (2), 210, pl. 2, figs. 1a - b, 2, 5, 7, 8.
1963 *Schuleridea rhomboidalis* Neale; P. Kaye, *Revue Micropaléont.,* **6**, 32, pl. 3, figs. 1 - 4.
1966 *Schuleridea rhomboidalis* Neale; P. Kaye & D. Barker, *Palaeontology,* **9** (2), 210 (not figured).
1969 *Schuleridea rhomboidalis* Neale; H. Hiltermann & E. Kemper, *Ber. Naturhist. Ges. Hannover,* **113**, 27, pl. 3, figs. 11, 13, 14.

Holotype: University of Hull coll. no. **HU.1.C.2.99**, ♀ car.

Type locality: Core depth 657 ft., N Fordon G. 1 borehole, N Fordon, E Yorkshire, England; lat. 54° 10'36.7" N, long. 0° 24' 15.6" W. Upper Hauterivian, Lower Cretaceous.

Explanation of Plate 7, 30

Fig. 1, ♀ car., ext. rt. lat. (holotype, **HU.1.C.2.99**, 750 μm long); fig. 2, ♂ RV, ext. lat. (paratype, **HU.1.C.2.100**, 752 μm long).
Scale A (100 μm; x 114), fig. 1; scale B (100 μm; x 122), fig. 2.

Figured specimens: University of Hull coll. nos. **HU.1.C.2.99** (holotype, ♀ car.: Pl. 7, 30, fig. 1; Pl. 7, 32, fig. 2), **HU.1.C.2.100** (♂ RV: Pl. 7, 30, fig. 2; Pl. 7, 32, fig. 1), **HU.1.C.2.94** (♀ LV: Pl. 7, 32, fig. 3). All specimens from the type locality. **HU.1.C.2.99** and **HU.1.C.2.100** from the type horizon. **HU.1.C.2.94** from core depth 653ft. 9ins.

Remarks: In lateral view the female is characteristically rhomboidal in shape with a smooth or faintly pitted valve surface. Common in the Upper Hauterivian and Barremian of Britain it is also known from the Barremian of Heligoland. J. Rey *et al* (*C. R. Somm. Seances Soc. Géol. France,* **5**, 153, 1968), M. M. Ramalho & J. Rey (*Bolm. Soc. geol. Port.,* **17**, 32 - 33, 1960), M. M. Ramalho & J. Rey (*Mem. B. R. G. M.*, **86**, 268, 1973) and J. Rey (*C. R. 96th Congr. Nat. Soc. Savantes, Toulouse* 1971, **2**, 323, 1974) have noted *S.* aff. *rhomboidalis* in the Cretaceous Basin of Portugal in pre-Valanginian beds near the Jurassic-Cretaceous boundary. The specimens are not figured and appear to occur too low stratigraphically to be the true *S. rhomboidalis.*

Explanation of Plate 7, 32

Fig. 1, ♂ RV, ext. dors. (paratype, **HU.1.C.2.100**, 752 μm long); fig. 2, ♀ car., ext. dors. (holotype, **HU.1.C.2.99**, 750 μm long); fig. 3, ♀ LV, int. lat. (**HU.1.C.2.94**, 712 μm long).
Scale A (100 μm; x 90), fig. 1; scale B (100 μm; x 99), fig. 2; scale C (100 μm; x 115), fig. 3.


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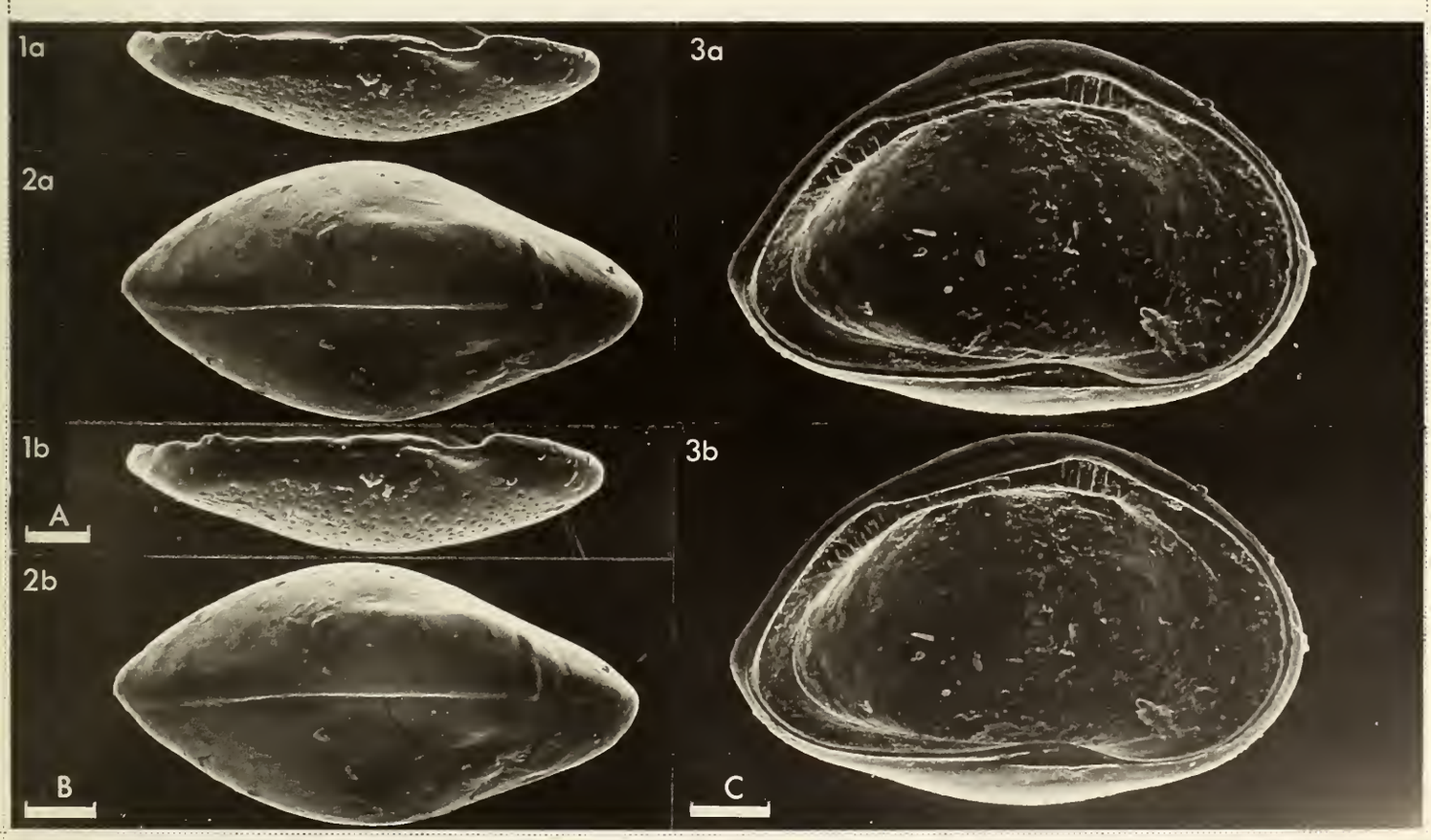
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Stereo-Atlas of Ostracod Shells 7 (7) 33 - 36 (1980)
595.337.14 (116.311) (427.4:162.000.54) : 551.351 + 552.52.

ON *PARANOTACYTHERE SPEETONENSIS* (NEALE)

by John W. Neale
(University of Hull, England)

Paranotacythere speetonensis (Neale, 1962)

1962 *Orthonotacythere speetonensis* new species J. W. Neale, *Micropaleontology*, 8, (4), 454, pl. 10, figs. 1 - 7; pl. 12, figs. 14 - 21.

Holotype: University of Hull coll. no. **HU.1.C.20.7**, ♀ RV.

Type locality: Coastal Section, D6 Beds, Speeton Clay, Speeton, E Yorkshire, England, lat. 54° 10' N, long. 0° 14' 40" W. *Peregrinoceras albidum* zone, Berriasian, Lower Cretaceous.

Figured Specimens: University of Hull coll. nos. **HU.1.C.20.21** (♀ LV: Pl. 7, 34, fig. 1), **HU.1.C.20.23** (♂ LV: Pl. 7, 34, fig. 2), **HU.1.C.20.39** (LV, instar 7: Pl. 7, 36, fig. 1), **HU.1.C.20.20** (♂ LV: Pl. 7, 36, fig. 2).

Explanation of Plate 7, 34

Fig. 1, ♀ LV, ext. lat. (paratype, **HU.1.C.20.21**, 700 μm long); fig. 2, ♂ LV, ext. lat. (paratype, **HU.1.C.20.23**, 710 μm long). Scale A (100 μm; x 129), figs. 1, 2.

Diagnosis: In side view oblong with slightly concave dorsal margin sub-parallel to ventral margin. Costate and tuberculate ornamentation, the six most prominent tubercles forming a triangle behind the median sulcus and an inverted triangle in front of it. A ventral ridge links the lower three tubercles. Sexual dimorphism very marked, the presumed males much lower in proportion to the length than the presumed females.

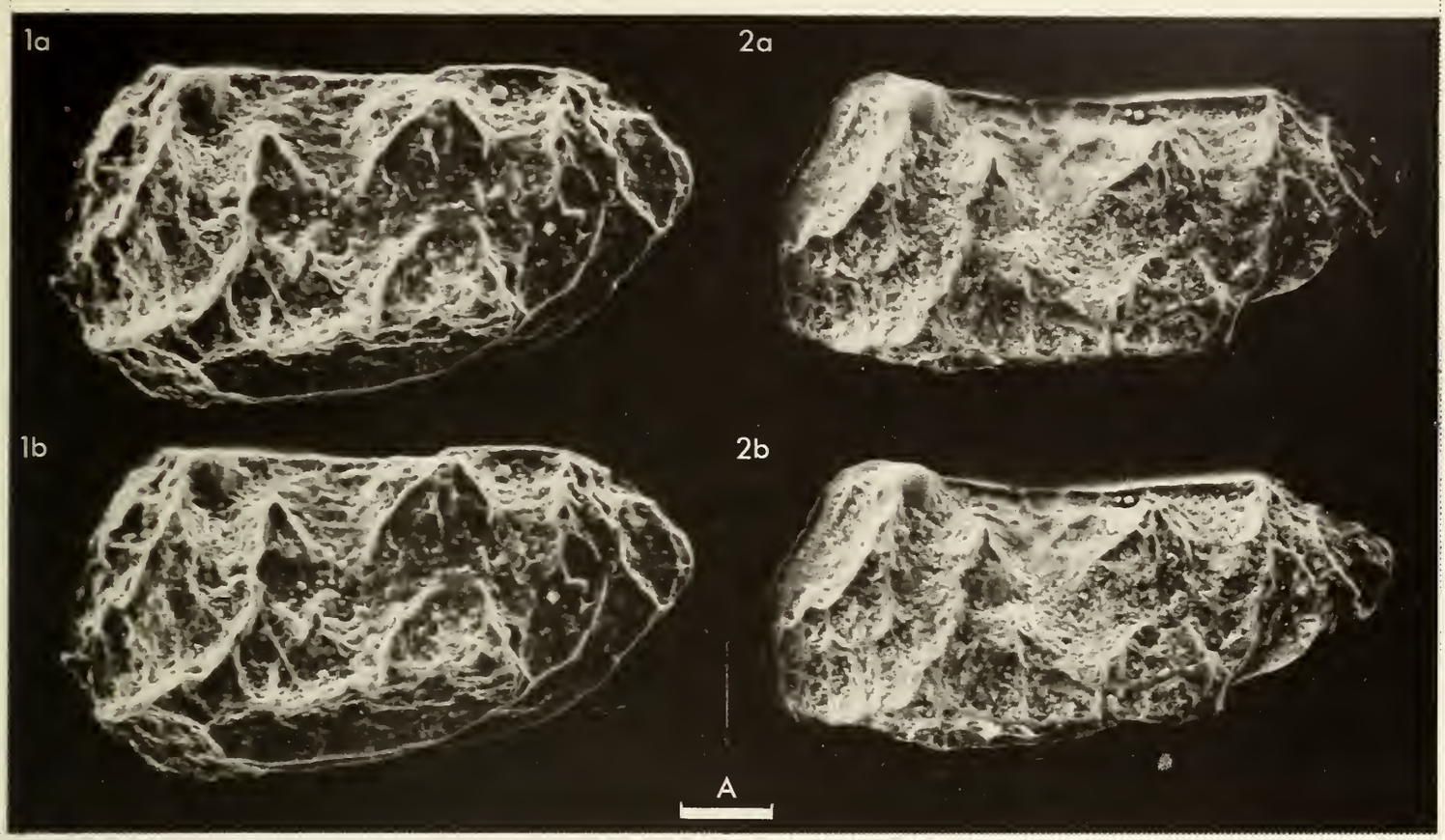
Remarks: The adult hinge is antimerodont and the very prominent eye tubercle lies immediately above the most anterodorsal of the six main tubercles. Earlier instars are more triangular in side view with a convex dorsal margin. In the earlier stages reticulation is more in evidence than tuberculation and Instar 7 (Pl. 7, 36, fig. 1) has a prominent posteroventral spine which is not seen in the later stages. J. Rey *et al (C. R. Somm. Seances Soc. Geol. France*, 5, 153, 1968) and M. M. Ramalho & J. Rey (*Bolm. Soc. geol. Port.*, 17, 33, 1969) note, but do not figure, *Orthonotacythere cf. speetonensis* in beds regarded as largely Berriasian in age in the Cretaceous Basin of Portugal.

Distribution: *P. speetonensis* is very common in the Blue Red (D6) at Speeton where it occurs associated with *Schuleridea juddi* Neale, *Mandelstamia sexti* Neale, *Paracypris caerulea* Neale and *Galliaecytheridea teres* (Neale). The beds are typically lithified, fine-grained, calcareous muds and all these species have not been found outside rocks of Berriasian age.

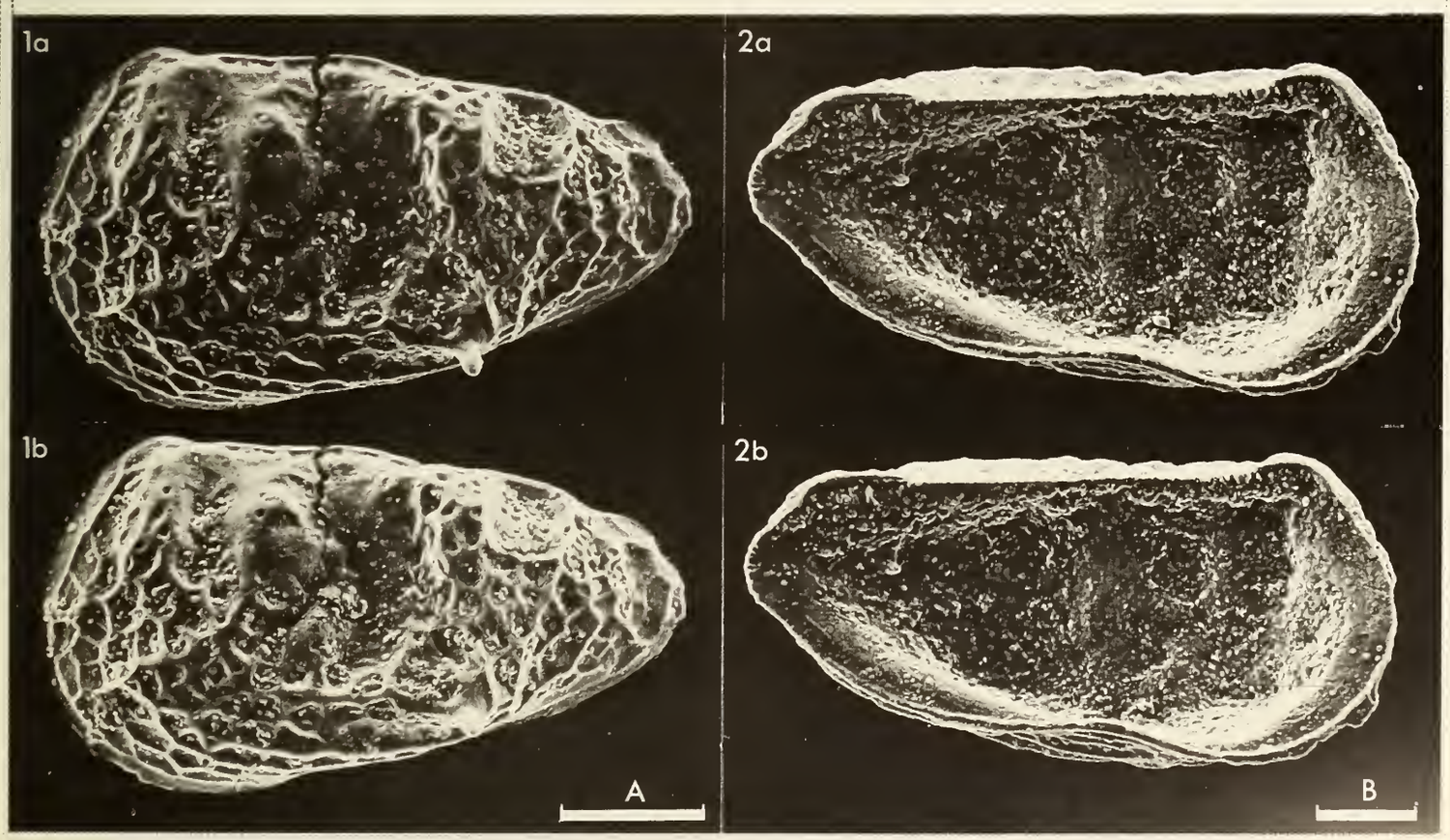
Explanation of Plate 7, 36

Fig. 1, LV, instar 7, ext. lat. (**HU.1.C.20.39**, 455 μm long); fig. 2, ♂ LV, int. lat. (**HU.1.C.20.20**, 660 μm long). Scale A (100 μm; x 200), fig. 1; scale B (100 μm; x 142), fig. 2.

Paranotacythere speetonensis (2 of 4)



Paranotacythere speetonensis (4 of 4)



Stereo-Atlas of Ostracod Shells 7 (8) 37 - 44 (1980)
595.337.12 (119.9) (931:163.170.45 + 163.152.30) : 551.31

ON *SCOTTIA AUDAX* (CHAPMAN)

by Patrick De Deckker
(University of Adelaide, South Australia)

Scottia audax (Chapman, 1961)

1961 *Mesocypris audax* n. sp. M. A. Chapman, *Crustaceana*, 2 (4), 258, figs. 1 - 8.

Holotype: Otago Museum, Dunedin, New Zealand, dissected ♀, registration number not known.
[Paratypes: Brit. Mus. (Nat. Hist.) **1965.7.2.1 - 2**].

Type locality: Leith Saddle, Dunedin, New Zealand.

Explanation of Plate 7, 38

Fig. 1, ♀ car., ext. lt. lat. (**P 28615**, 1270 μm long); fig. 2, ♀ car., ext. dors. (**P 28617**, 1220 μm long); fig. 3, ♀ car., ext. vent. (**P 28616**, 1265 μm long).
Scale A (500 μm; x 44), figs. 1 - 3.

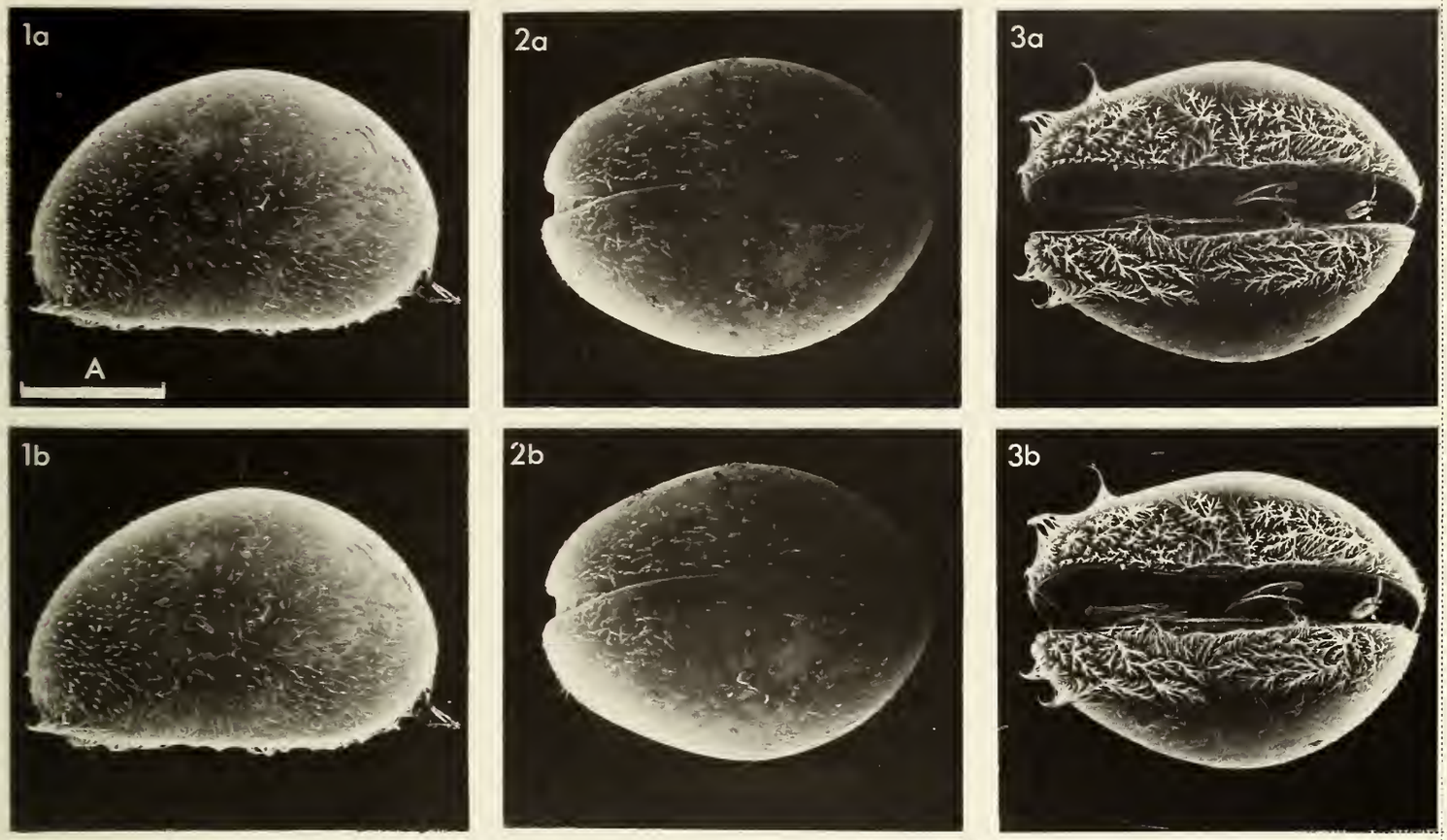
Figured specimens: Australian Museum, Sydney nos. **P 28615** (♀ car. LV: Pl. 7, 38, fig. 1), **P 28616** (♀ car. vent: Pl. 7, 38, fig. 3; vent. setae: Pl. 7, 40, figs. 3, 4), **P 28617** (♀ car. dors: Pl. 7, 38, fig. 2), **P 28687 a, b** (♀ car.: Pl. 7, 40, figs. 1, 2, text-figs. 7, 42 & 7, 44). All specimens collected by Miss J. Nicholson on June 16th 1976 from leaf litter, Moonpar State Forest near Dorrigo, New South Wales.

Diagnosis: Carapace smooth and hairy, epecially in ventral area which is very broad and almost flat; shell thick; selvage further away from edge of shell in posteroventral area in both valves and closest anteriorly in LV. Hinge line, when viewed dorsally, straight except at both extremities where LV overlaps RV. Natatory setae of antenna reduced; 1st thoracic appendage with single terminal claw and long, thick terminal bristle; furca strong with broad and short claws (coarsely denticulated), thin and pilose anterior bristle, posterior bristle broader, pilose and as long as claws. Furcal shaft with 5 rows of thick spinules.

Remarks: *Scottia audax* was originally described by M. A. Chapman (1961) as a species of *Mesocypris*. It is considered, however, that the resemblance of this species to *Scottia pseudobrowniana* Kempf, [*Eiszeitalter u. Gegenwart*, 22, 43 - 46, 1971] necessitates a change at the generic level: the shell morphologies and appendages being very alike. The most diagnostic similarity is the presence of a long and thick distal bristle on the 1st thoracic appendage that is almost as long as the distal claw. In *Mesocypris*, on the contrary, this bristle is thin and small. For the same reason, *Scottia insularis* Chapman [*Hydrobiologia*, 22, 1 - 40, 1963] should be transferred to *Mesocypris* as *M. insularis* because of the short and thin bristle on the 1st thoracic appendage.

Explanation of Plate 7, 40

Fig. 1, LV, int. lat. (**P 28687a**, 1210 μm long); fig. 2, RV, int. lat. (**P 28687a**, 1180 μm long); figs. 3, 4, setae (**P 28616**, 1265, μm long).
Scale A (500 μm; x 44), figs. 1, 2; scale B (25 μm; x 450), fig. 3; scale C (50 μm; x 220), fig. 4.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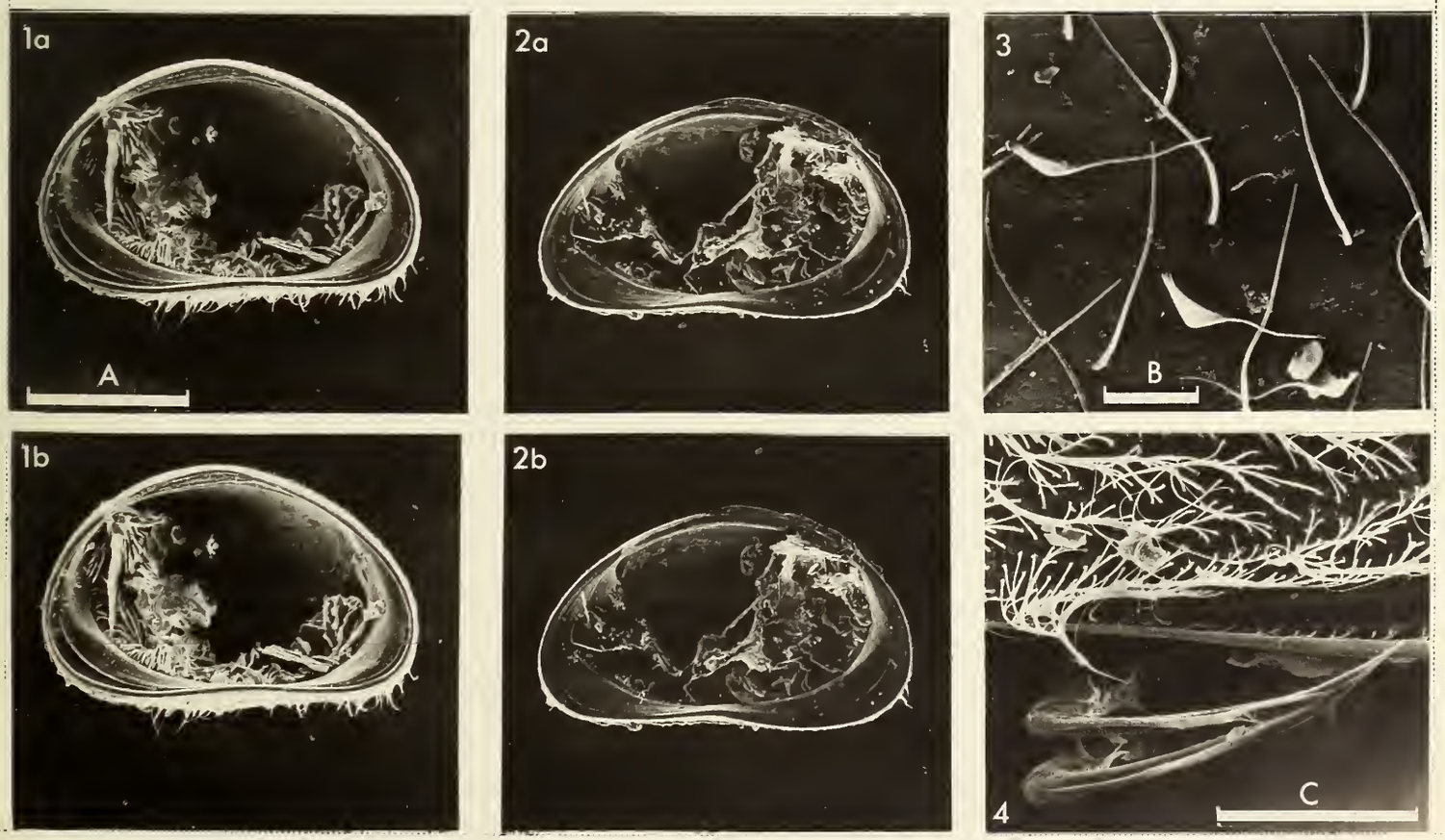
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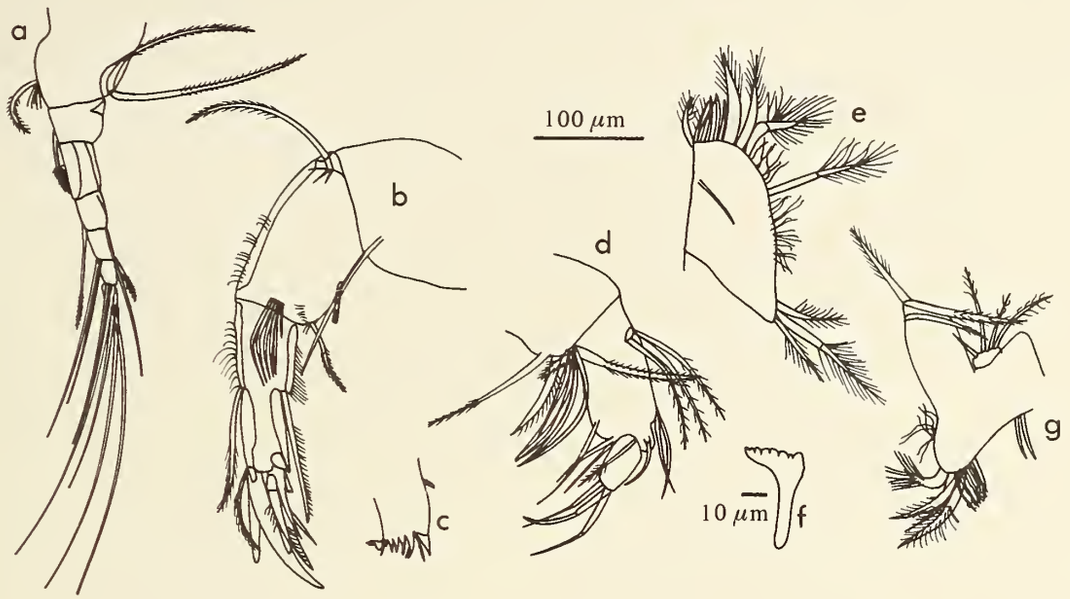
4
C

Remarks: (contd.) *Scottia audax*, of which no male has so far been described, differs from *S. pseudobrowniana* on the following details: a slight rib, running parallel to the hinge is present on the shell in the dorsal area of *S. pseudobrowniana;* best seen when the shell is viewed from the anterior – this ridge is absent in *S. audax*. Also in *S. pseudobrowniana*, the overlap of LV over RV, just in the area anterior to the hinge, is triangular in shape and forms a small lump. This feature was seen on the holotype (Brit. Mus. (Nat. Hist.) no. **(1900.3.6.35A)** designated by Kempf (1971) and on specimens found in Sars' collection (Oslo Museum) donated by Norman and collected in Dec. 1886 from the type locality – this feature is absent in *S. audax*. An extremely long and thick bristle, plumose at its end, is attached on the inner side of the inner masticatory process of the maxilla of *S. pseudobrowniana* whereas it has not been seen in *S. audax*. The denticulation of the furcal claws differs in both species: in *S. pseudobrowniana*, the short denticles are present along the middle third of the length of the claw whereas in *S. audax* they are long and almost indistinguishable from the other denticles in the distal third of the claw, in the former species they are longer and finer.

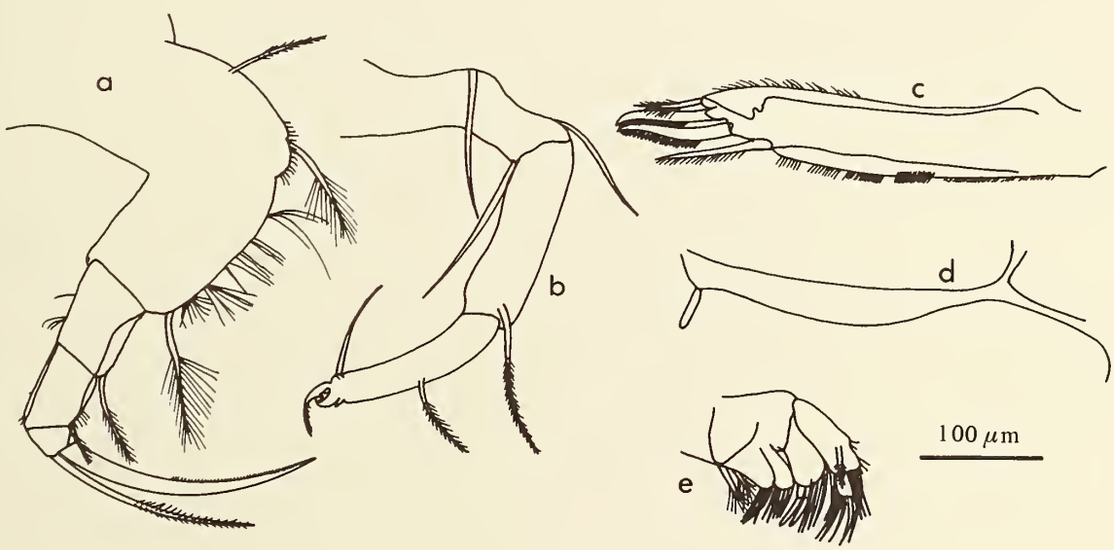
Remarks: (contd.) Apart from these differences, the morphology of the female appendages of both species is identical after comparison with the type specimens and with the description of *S. pseudobrowniana* by D. L. Danielopol & E. E. Vespremeanu (*Fragmenta Balcanica Mus. Maced. Sc. Nat.,* **5**, 135 - 146, 1964) and Bronstein, Z. S. (*Faune de L'URSS* (n.s.), **31**, Crustacés **2** (1), 1 - 339, 1947). Note that the species described by the former authors was collected from "the aerial top layer of the floating fen, in the soil and plant detritus" in Roumania. *Scottia audax* and specimens belonging to *Mesocypris* collected together, have only been found in leaf litter in Australia.

Scottia and *Mesocypris* are closely related because their morphologies are alike. They should be included in the subfamily Scottinae Bronstein, 1947 as already suggested by Danielopol *in* McKenzie (*Ann. S. Afr. Mus.* **57** (9), 157 - 217, 1971) and reaffirmed by De Deckker (*VII International Symposium on Ostracodes* – ed. Serbain Geological Society, 9 - 17, 1979). *Psychrodromus* Danielopol & McKenzie 1977 is also closely related to *Mesocypris* and therefore should be included in this subfamily.

Distribution: *S. audax* has so far been found in New Zealand and eastern Australia.



Text-fig. 1, ♀ **(P 28687b)** a: antennula; b: antenna; c: mandibular coxale; d: mandibular palp; e: left maxilla – masticatory process of protopodite; f: rake-like organ; g: right maxilla. 10 µscale refers to fig. 1f only.



Text-fig. 2, ♀ **(P 286876)** a: 1st thoracic appendage; b: 2nd thoracic appendage; c: furca; d: furcal attachment; e; maxillular masticatory processes and palp.

595.337.14 (119) (262.1:161.015.38 + 161.014.40 + 262.2 : 161.034.34 + 261.273 : 162.006.51 + 262.1 + 262.3 + 262.4) : 551.351

ON *AURILA WOODWARDII* (BRADY)

by John Athersuch
(B.P. Research Centre, Sunbury-on-Thames, England)

Aurila woodwardii (Brady, 1868)

1868 *Cythere woodwardii* sp. nov. G. S. Brady, Cote de Sicile; *in: Les Fonds de la Mer,* L. De Folin and L. Perier, Paris, **1**, 93, pl. 10, figs. 19 - 21.
1963 *Aurila woodwardii* (Brady); K. G. McKenzie, *Annuar. Ist. Mus. Zool. Univ. Napoli,* **15**, (1), 8, pl. 1, figs. 1 - 3.
1964 *Aurila woodwardii* (Brady); K. G. McKenzie, *Ibid,* **16** (6) 15, pl. 6, fig. 2.
1971 *Aurila woodwardii* (Brady); P. J. Barbeito-Gonzalez, *Mitt. hamb. zool. Mus. Inst.,* **67**, 276, pl. 11, figs. 1a, 2a, 3a.
1972 *Aurila woodwardii* (Brady); H. Uffenorde, *Göttinger Arb. Geol. Paläont.,* **13**, 77, pl. 8, fig. 7.

Type specimen: (presumed lost). Brady did not designate a holotype and no specimens of this species could be found in the Brady collections at the Hancock Museum, Newcastle or at the Brit. Mus. (Nat. Hist.), London. The selection of a neotype is considered unnecessary since this species is quite distinct from any other described species of *Aurila.*

Explanation of Plate 7, 46

Fig. 1, ♀ car., ext. rt. lat. (**1980.10**, 770 μm long); fig. 2, ♀ car., ext. lt. lat. (**1980.9**, 810 μm long); fig. 3, ♀ car., ext. lt. lat. (**1980.3**, 814 μm long).
Scale A (250 μm; x 70), figs. 1 - 3.

Type locality: Messina, Sicily, approx. lat. 38° 13' N, long. 15° 33' E.

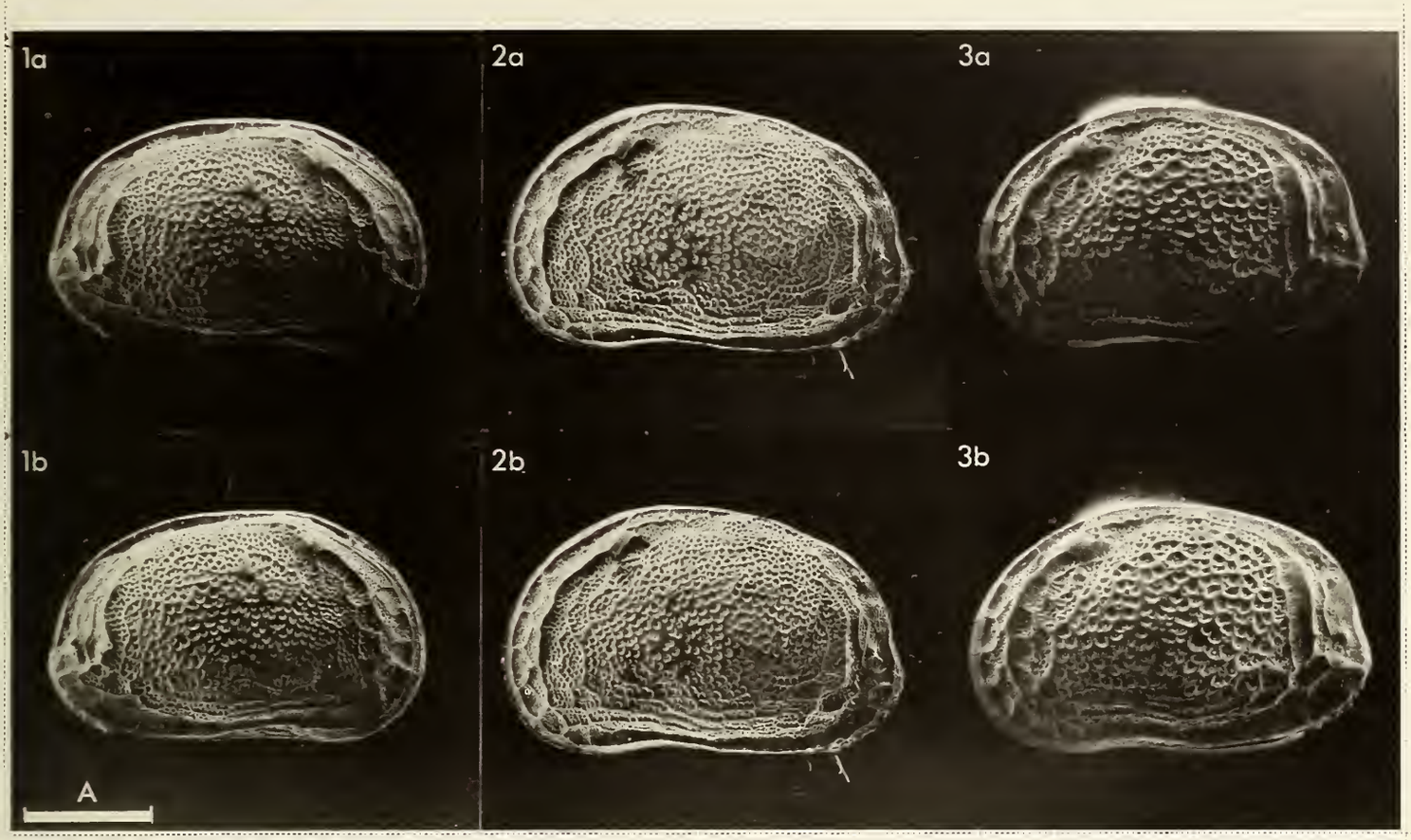
Figured specimens: Brit. Mus. (Nat. Hist.) nos. **1980.2** (♀ car.: Pl. **7**, 48, fig. 1), **1980.3** (♀ car.: Pl. **7**, 46, fig. 3), **1980.4** (♀ car.: Pl. **7**, 48, fig. 3), **1980.5** (♀ LV: Pl. **7**, 52, fig. 1), **1980.6** (♂ LV: Pl. **7**, 48, fig. 2; Pl. **7**, 50, figs. 1, 2; text-fig. 1), **1980.7** (♀ LV: Pl. **7**, 50, fig. 3; Pl. **7**, 52, figs. 3, 5), **1980.8** (♀ RV: Pl. **7**, 52, figs. 2, 4), **1980.9** (♀ car.: Pl. **7**, 46, fig. 2), **1980.10** (♀ car.: Pl. **7**, 46, fig. 1).

Specimens **1980.2 - 8** were collected live by J. Athersuch on 2.11.1973 near Cape Greco, Cyprus, approx. lat. 34° 56' N, long. 34° 05' E, water depth 0.5m, salinity 39.5‰ , temperature 23.5°C, on filamentous algae. **1980.9** from West Angle Bay, Wales, approx. lat. 51° 55' N, long. 05° 19' W was collected live by K. Trier from littoral algae. **1980.10** from Lago di Fusaro, a shallow lagoon near Naples, approx. lat. 40° 50' N, long. 14° 15' E, deposited in the B. M. (N. H.) collections by K. G. McKenzie (ex-no. **1972.3.2.9**).

Diagnosis: Carapace subquadrate; left valve with broad accommodation groove; prominent ridges run parallel to anterior and posterodorsal margins. Distinct marginal rim anteriorly which, in the left valve, continues along the dorsal margin; this feature most noticeable in males.

Explanation of Plate 7, 48

Fig. 1, ♀ car.,ext. rt. lat. (**1980.2**, 742 μm long); fig. 2, ♂ LV, ext. lat. (**1980.6**, 857 μm long); fig. 3, ♀ car., dors. (**1980.4**, 743 μm long).
Scale A (250 μm; x 70), figs. 1 - 3.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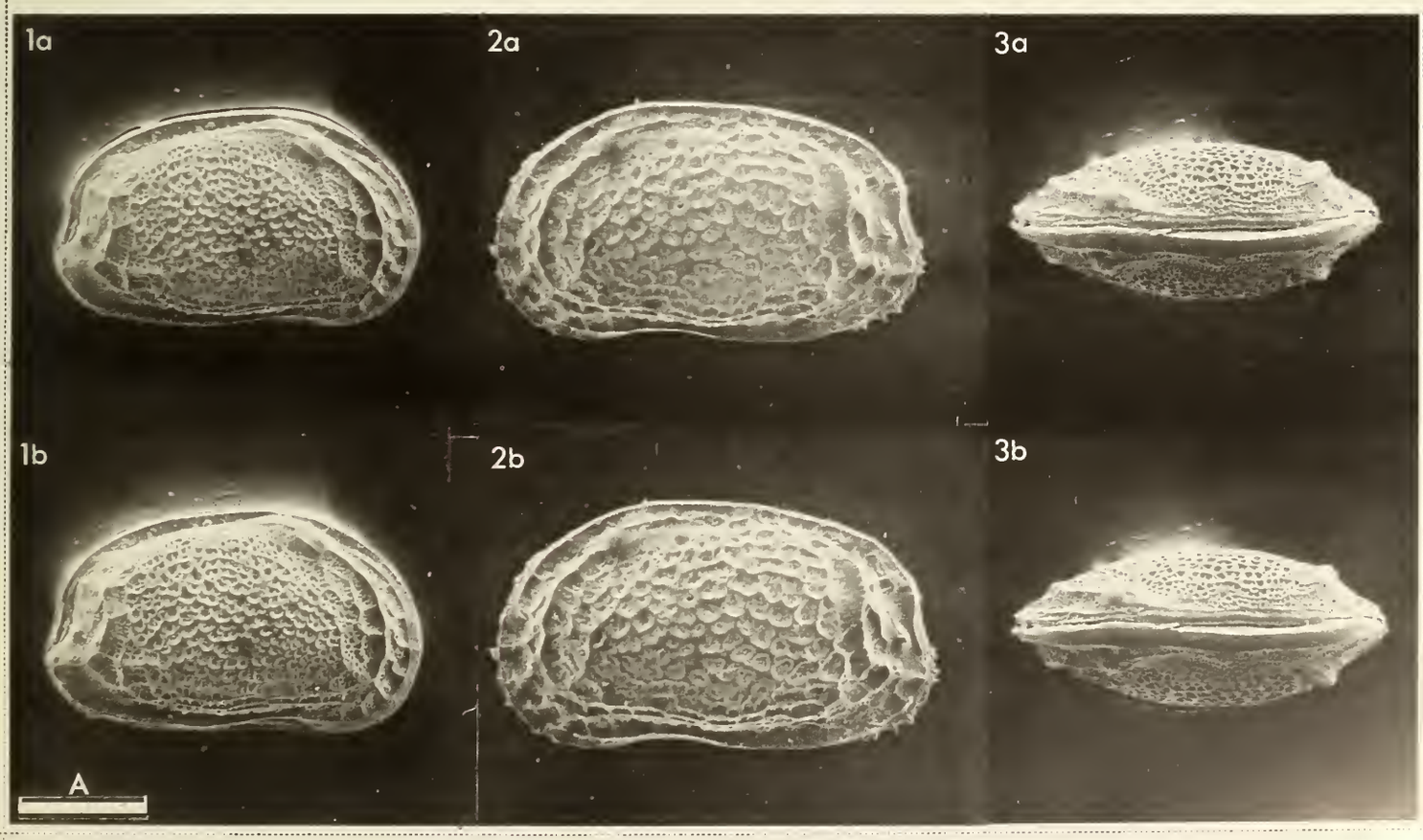
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Remarks: This species has been found in littoral marine and brackish lagoonal environments in association with algae. This is the first occasion on which it has been recorded outside the Mediterranean.

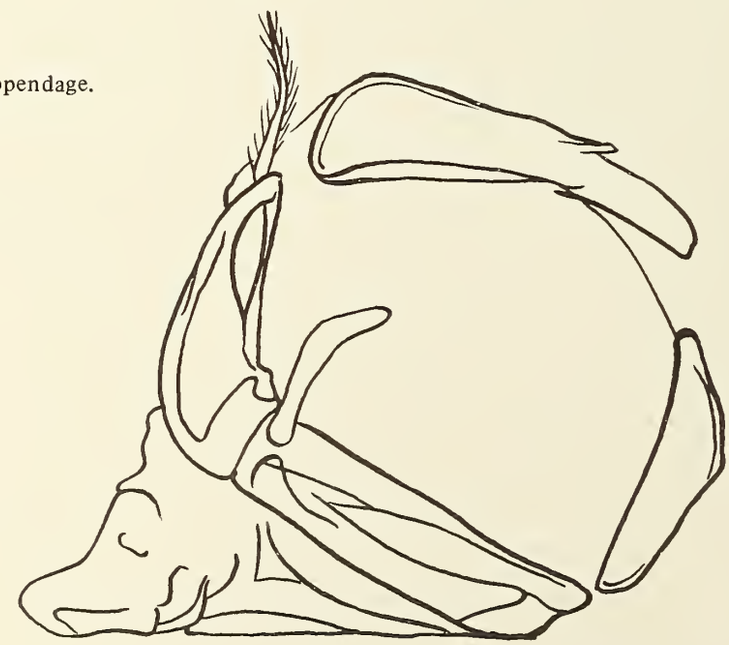
Distribution: Recent: Italy (McKenzie, *op. cit.*), Sicily (Brady, *op. cit.*), Adriatic (Uffenorde, *op. cit.*), Aegean (Barbeito-Gonzalez, *op. cit.*), Cyprus, Wales (herein), Spain, N Africa (*fide* McKenzie, 1964, *op. cit.*).

Explanation of Plate 7, 50

Figs. 1, 2, ♂ LV, ext. showing normal pores and setae (**1980.6**); fig. 3, ♀ LV, int. lat. (**1980.7**, 810 μm long).
Scale A (5 μm; x 2800), fig. 1; scale B (25 μm; x 690), fig. 2; scale C (250 μm; x 70), fig. 3.

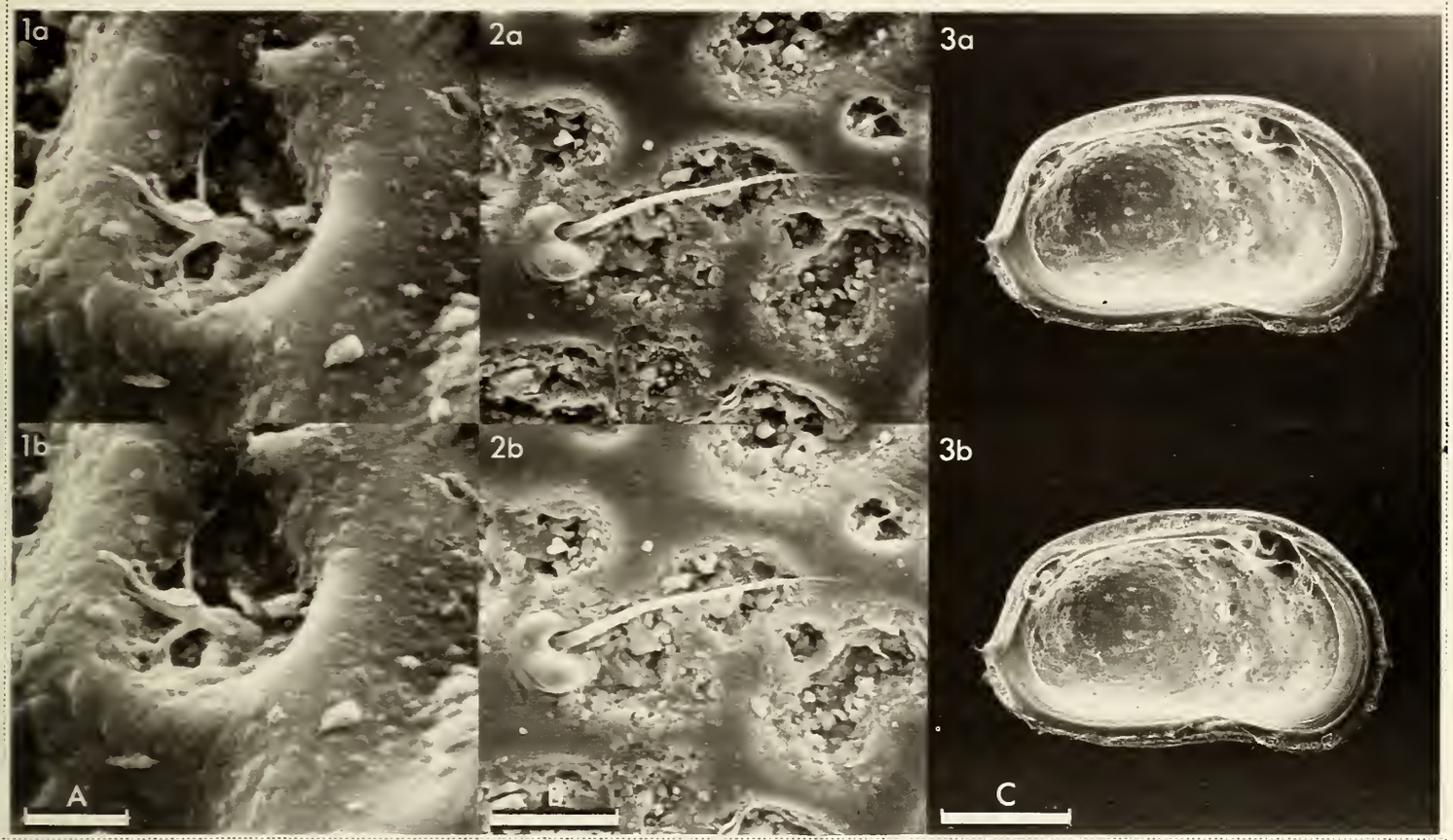
Text-fig. 1 ♂ copulatory appendage.
(Scale = 100 μm; **1980.6**)

Text-fig. 1
100 μm



Explanation of Pl. 7, 52

Fig. 1, ♀ LV, int. musc. sc. (**1980.5**, 743 μm long); figs. 2, 4, ♀ RV, terminal hinge elements (**1980.8**, 770 μm long); figs. 3, 5, ♀ LV, terminal hinge elements (**1980.7**).
Scale A (50 μm; x 350), fig. 1; scale B (100 μm; x 160), figs. 2 - 5.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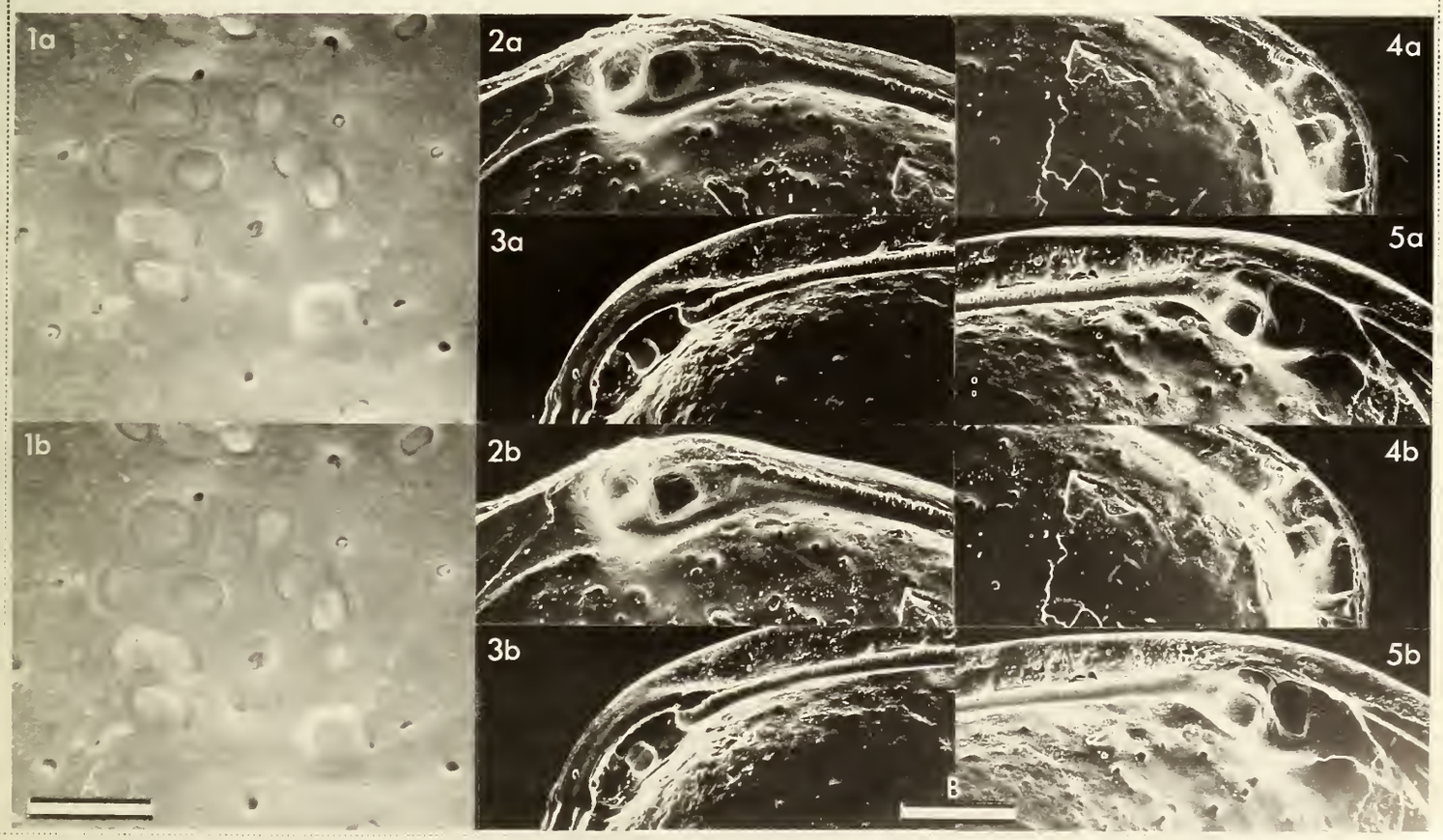
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B

595.337.14 (119) (262.5:161.028.44 + 497.2:161.027.43 + 262.2:161.025.37 + 262.4 + 262.3 + 262.54) : 551.313.1 + 551.351 (24.08.0 - 4) + 551.351 (24.08.30 - 40).

ON *LOXOCONCHA PONTICA* KLIE

by John Athersuch
(B.P. Research Centre, Sunbury-on-Thames, England)

Loxoconcha pontica Klie, 1937

1937 *Loxoconcha pontica* sp. nov. W. Klie, *Mitt. Kgl. Naturw. Inst.*, **10**, 13, figs. 24 - 30.
1967 *Loxoconcha pontica* Klie; F. E. Caraion, *Fauna Repub. pop. rom.*, 4 (10), 107, figs. 30 A - G.
1969 *Loxoconcha pontica* Klie; E. Shornikov, *Definitive Fauna of the Black and Azov Seas*, **2**, 198, pl. 24, fig. 3 (four illustrations).
1971 *Loxoconcha micra* sp. nov. P. J. Barbeito-Gonzalez, *Mitt. hamb. zool. Mus. Inst.*, **67**, 307, pl. 32, figs. 1a, 2a, 3a, 4a.

Lectotype: (designated herein) Hamburg Zoologisches Museum no. **K 30451** (ex-Klie collection, ♀ RV.
[Paralectotypes: several specimens of both dimorphs containing soft parts in the Klie collection].

Type locality: Lake Varna, Black Sea coast of Bulgaria; Recent.

Explanation of Plate 7, 54

Fig. 1, ♂ RV, ext. lat. (**K 30445**, 524 μm long); fig. 2, ♂ RV, ext. lat. (**1976.1083**, 548 μm long); fig. 3, ♂ LV, ext. lat. (**1976.1077**, 537 μm long).
Scale A (250 μm; x 113), figs. 1 - 3.

Figured specimens: Hamburg Zoologisches Museum no. **K 30445** (♂ RV: Pl. 7, 54, fig. 1), **K 30451** (lectotype, ♀ RV: Pl. 7, 58, fig. 1). Brit. Mus. (Nat. Hist.) no. **1976.1077** (♂ LV: Pl. 7, 54, fig. 3), **1976.1078** (♀ LV: Pl. 7, 56, fig. 1), **1976.1079** (♂ car.: Pl. 7, 56, fig. 2), **1976.1080** (♀ car.: Pl. 7, 56, fig. 3), **1976.1081** (♂ LV: Pl. 7, 58, fig. 2; Pl. 7, 60, figs. 3, 5), **1976.1082** (♀ RV: Pl. 7, 58, fig. 3; Pl. 7, 60, figs. 1, 2, 4), **1976.1083** (♂ RV: Pl. 7, 54, fig. 2). No. **K 30445** was collected by P. J. Barbeito-Gonzalez from Naxos, Greece (approx. lat. 37° 00' N, long. 25° 24' E); water depth 0 - 4m. No. **30451** was collected by A. Valkonov during August 1934 from Lake Varna, Bulgaria (approx. lat. 43° 12' N, long. 27° 57' E). Nos. **1976.1077 - 1083**, from amongst stones at 5m at Agigea (approx. lat. 44° 05' N, long. 28° 37' E), Romanian coast of the Black Sea, were kindly given by F. E. Caraion.

Diagnosis: Carapace surface with numerous, small pits and ghost reticulation. Shape and male copulatory appendages diagnostic.

Remarks: Klie (1937) reported finding specimens of *L. pontica* at Djavolosco marsh (salinity 7 - 11‰), on the Bulgarian Black Sea coast. A few specimens collected by the author from Cyprus were found at depths of 30 - 40m and at a salinity of 39‰.

Distribution: A common phytal species in the Black Sea; Romanian coast (Klie 1937); Azov Sea (Shornikov 1969); Adriatic (Klie, *Zool. Anz.* **139**, 67, 1943); Cyprus (authors coll.). As *L. micra* in the Aegean (Barbeito-Gonzalez 1971).

Explanation of Plate 7, 56

Fig. 1, ♀ LV ext. lat. (**1976.1078**, 500 μm long); fig. 2, ♂ dors. car. (**1976.1079**, 573 μm long); fig. 3, ♀ dors. car. (**1976.1080**, 512 μm long).
Scale A (250 μm; x 113), figs. 1 - 3.


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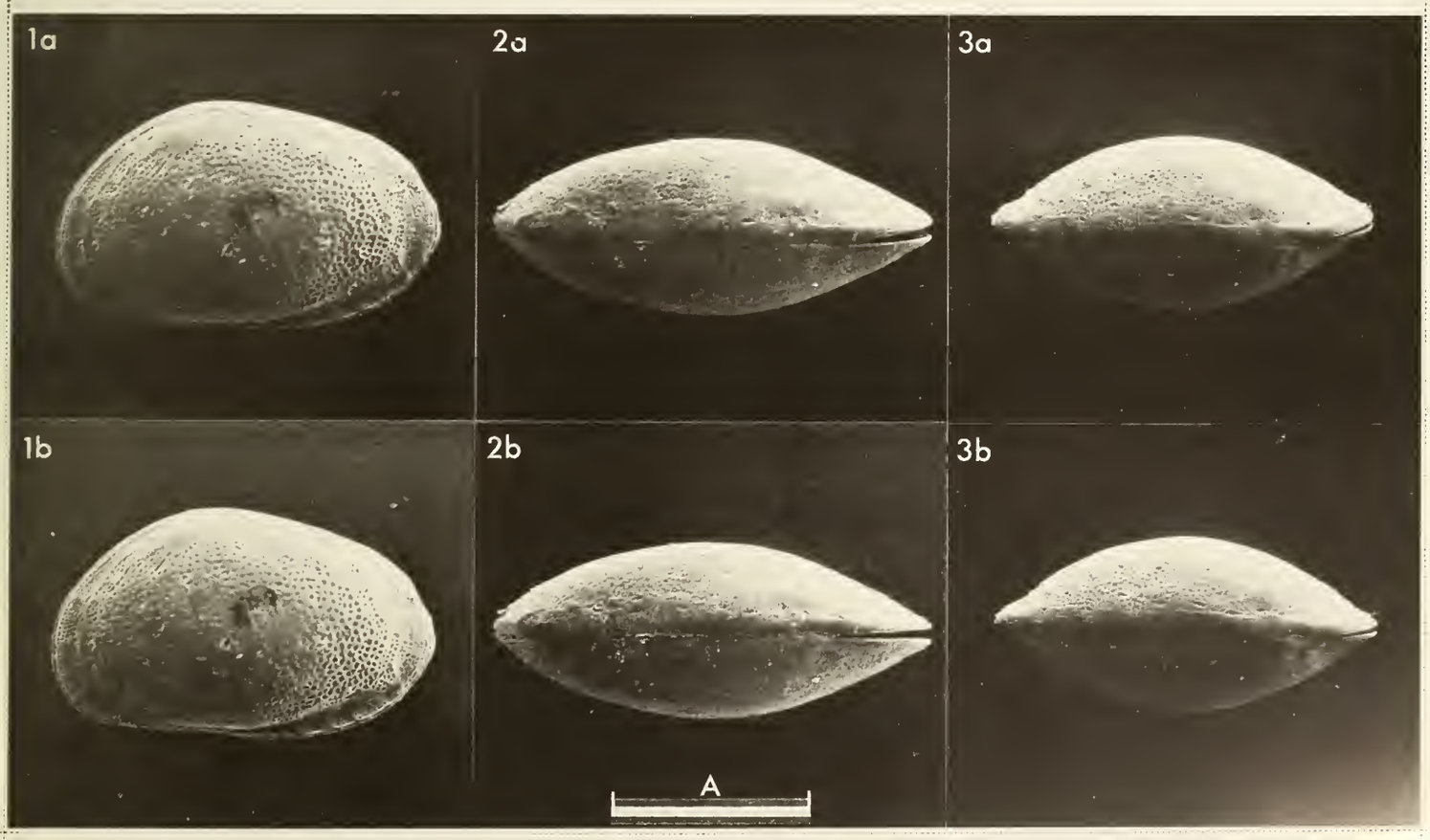
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Stereo-Atlas of Ostracod Shells 7 (11) 61 - 66 (1980)
595.337.14 (119.9) (261.26 + 261.27 + 261.28) : 551.351

ON *CALLISTOCYTHERE LITTORALIS* (MÜLLER)

by John Athersuch and John E. Whittaker
(B. P. Research Centre, Sunbury and British Museum (Natural History), London)

Genus *CALLISTOCYTHERE* Ruggieri, 1953
Type species: *Cythere littoralis* Müller, 1894

1958 *Cryptocythere*, M.I. Mandelstam, *Trudy vses. neft. naucho-issled. geol.-razv. Inst.* (Microfauna SSSR), **9**, 280.

Diagnosis: Carapace elongate, subquadrangular; surface ornament undulating and anastomising ridges. Anterior hinge element of left valve with two or more distinct teeth. Vestibule poorly developed or absent.

Remarks: *Callistocythere* is less elongate, more heavily ornamented and has a thicker shell than *Leptocythere*. The hinge of the former genus is more robust, the anterior hinge element being divided into two to four individual toothlets while *Leptocythere* has only a single tooth. Moreover, an anterior vestibule is well developed in *Leptocythere*, but poorly developed or absent in *Callistocythere*. The appendages of these two genera are not noticeably different.

Explanation of Plate 7, 62

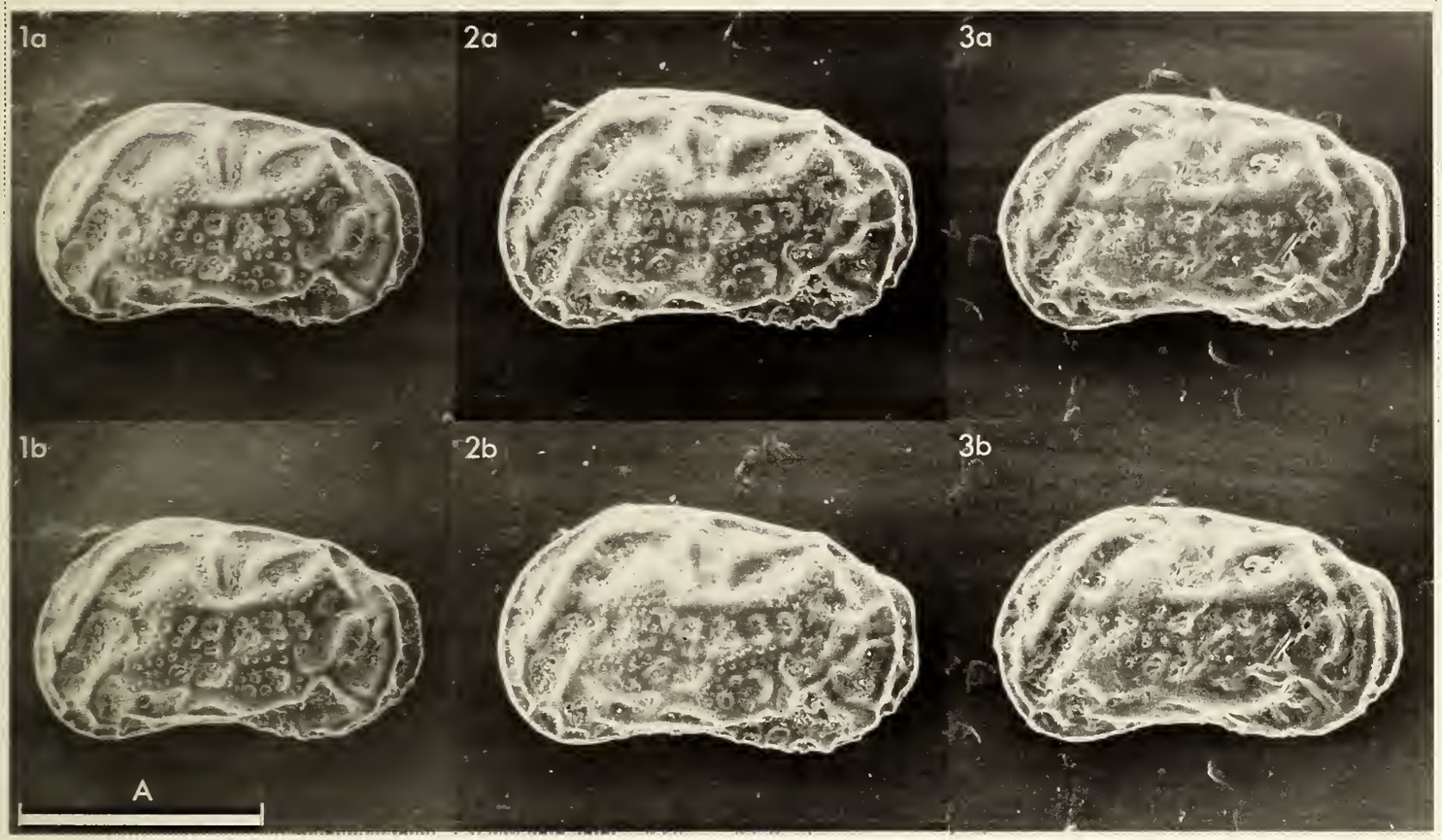
Fig. 1, ♀ car., ext. lt. lat. (neotype, **1980.11**, 400 μm long); fig. 2, ♀ LV, ext. lat. (**1980.12**, 440 μm long); fig. 3, ♀ car., ext. lt. lat. (**1980.15**, 430 μm long).
Scale A (250 μm; x 133), figs. 1 - 3.

Callistocythere littoralis (Müller, 1894)

1866 *Cythere cicatricosa* sp. nov. G. O. Sars, *Forh. VidenskSelsk. Krist.*, 33 (junior homonym of *C. cicatricosa* Reuss, 1850).
1869 *Cythere cicatricosa* Sars; G. S. Brady and D. Robertson, *Ann. Mag. nat. Hist.*, ser. 4, **3**, 368, pl. 19, figs. 13, 14.
1874 *Cythere crispata* Brady; G. S. Brady, H. W. Crosskey and D. Robertson, *Palaeontogr. Soc.*, 146, pl. 11, figs. 52, 53; pl. 13, figs. 12, 13 (*non C. crispata* Brady, 1868).
1889 *Cythere crispata* Brady; G. S. Brady and A. M. Norman, *Scient. Trans. R. Dubl. Soc.*, **4**, 131, pl. 15, figs. 1, 2.
1894 *Cythere littoralis* sp. nov. G. W. Müller, *Fauna Flora Golf. Neapel*, **21**, 353, pl. 28, fig. 18.
1925 *Leptocythere crispata* (Brady); G. O. Sars, *An account of the Crustacea of Norway, vol. 9, Ostracoda*, Bergen Museum, 176, pl. 80, fig. 3.
1969 *Callistocythere pallida* (Müller); I. Yassini, *Bull. Inst. Geol. Bassin Aquitaine*, **7**, 40, pl. 15, fig. 23; pl. 17, fig. 7 (*non-C. pallida* Müller, 1894).
1976 *Callistocythere littoralis* (Müller); G. Bonaduce, G. Ciampo and M. Masoli, *Pubbl. Staz. zool. Napoli*, **40**, 39, text-fig. 21, pl. 11, figs. 1 - 7.

Explanation of Plate 7, 64

Fig. 1, ♀ RV, ext. lat. (**1980.13**, 450 μm long); fig. 2, ♀ car., ext. dors. (**1980.14**, 460 μm long); fig. 3, ♀ RV, int. lat. (**1980.16**, 420 μm long).
Scale A (250 μm; x 133), figs. 1 - 3.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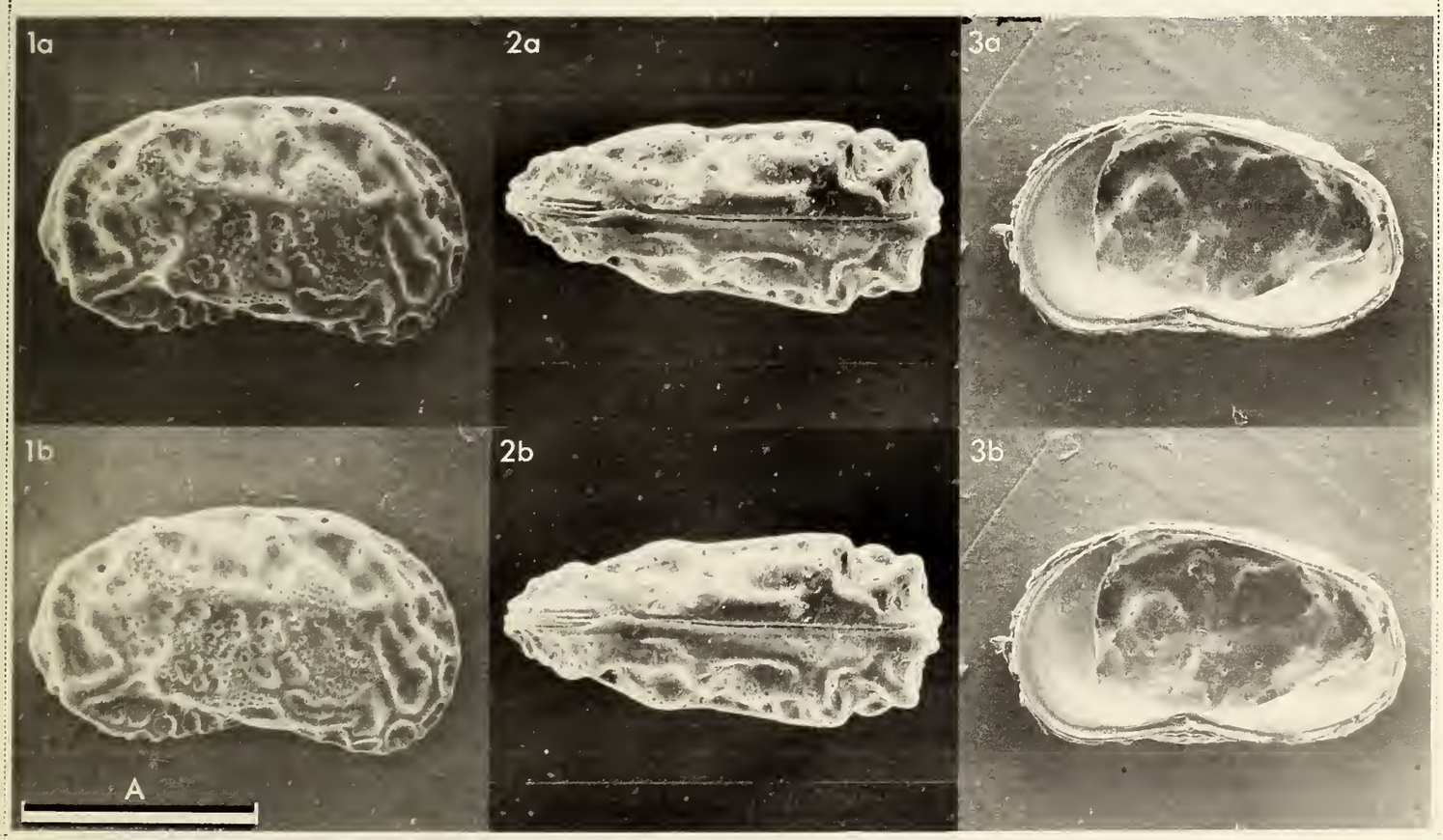
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Neotype: Brit. Mus. (Nat. Hist.) no. **1980.11**, ♀ car.

Type locality: Bay of Naples, Italy, approx. lat. 40° 50' N, long. 14° 15' E; Recent.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. **1980.11** (♀ car.: Pl. 7, 62, fig. 1); **1980.12** (♀ LV: Pl. 7, 62, fig. 2); **1980.13** (♀ RV: Pl. 7, 64, fig. 1); **1980.14** (♀ car.: Pl. 7, 64, fig. 2); **1980.15** (♀ car.: Pl. 7, 62, fig. 3); **1980.16** (♀ RV: Pl. 7, 64, fig. 3). **1980.11** and **1980.13**, from the type locality, were kindly given by G. Ruggieri. **1980.12** and **1980.14**, from Tenedos (now called Bozcaada), W Turkey, approx. lat. 39° 49' N, long. 26° 03' E, were picked from dried residues deposited by H. B. Brady in the Palaeontology Dept., Brit. Mus. (Nat. Hist.). **1980.15** and **1980.16** from The Fleet, Dorset, S England, approx. lat. 50° 36' N, long. 02° 28' W, collected by J. E. Whittaker on 28.5.69, were living on green algae; water depth 1.0m; salinity 31‰; temp. 17.4°C.

Diagnosis: Small (0.40 – 0.45mm long); prominent posterior ridge running sub-parallel to margin; central area of valves with broad anastomosing, pitted ridges; pits preferentially formed where ridges terminate or coalesce; anteriorly, a ridge, continuous with the eye tubercle, runs obliquely forward to the anteroventral margin; behind this ridge lie two large elongate fossae; mid-dorsolaterally a prominent, short, vertical ridge is separated from the central area by a U-shaped sulcus.

Remarks: *C. littoralis* was first described by Müller, 1894 from the Bay of Naples, but unfortunately his specimens no longer exist (Athersuch, *Pubbl. Staz. zool. Napoli*, **40**, 344 - 348, 1978). In order to establish the true identity of this species, we have chosen a neotype from the type locality which fits best in size and ornament Müller's original description and illustration. In Britain, *C. littoralis* has frequently been misidentified as *C. crispata* (Brady, 1868), and was thought by Brady and Robertson, 1869, Brady, Crosskey and Robertson, 1874 and Brady and Norman, 1889 to be merely a small northern variety of the latter species.

There is considerable variation in the degree of foveolation of the ridges, the British specimens having the most subdued secondary ornament.

Since no males appear ever to have been found, *C. littoralis* is believed to reproduce by parthenogenesis.

Distribution: Recent; Britain (J. E. W. collection); Ireland (Brady and Norman, *op. cit.*); Norway (Sars, *op. cit.*); Atlantic coast of France (Yassini, *op. cit.*); Tenedos and Bay of Naples (herein). A phytal species found frequently in the littoral and sublittoral zones.

Stereo-Atlas of Ostracod Shells 7 (12) 67 - 72 **(1980)**
595.337.14 (119.9) (262.2) : 551.351

ON *CALLISTOCYTHERE CRISPATA* (BRADY)

by John Athersuch and John E. Whittaker
(B.P. Research Centre, Sunbury and British Museum (Natural History), London)

Callistocythere crispata (Brady, 1868)

1868 *Cythere crispata* sp. nov. G. S. Brady, *Ann. Mag. nat. Hist.*, ser. 4, **2**, 221, pl. 14, figs. 14, 15.
non 1874 *Cythere crispata* Brady; G. S. Brady, H. W. Crosskey and D. Robertson, *Palaeontogr. Soc.*, 146, pl. 11, figs. 52, 53; pl. 13, figs. 12, 13. [= *C. littoralis* (Müller, 1894)].
non 1889 *Cythere crispata* Brady; G. S. Brady and A. M. Norman, *Scient. Trans. R. Dubl. Soc.*, 4, 131, pl. 15, figs. 1, 2. [= *C. littoralis* (Müller, 1894)].
non 1911 *Cythere crispata* Brady; G. S. Brady, *Proc. zool. Soc. Lond.*, **27**, 596, pl. 20, figs. 3, 4.
1968 *Callistocythere adriatica* sp. nov. M. Masoli, *Mem. Mus. Trident. Sci. Nat.*, **17**, 19, pl. 1, fig. 12; pl. 6, figs. 71 - 73.
1971 *Callistocythere diffusa* (Müller); P. J. Barbeito-Gonzalez, *Mitt. hamb. zool. Mus. Inst.*, **67**, 274, pl. 10, figs. 1b, 2b, 3b [*non C. diffusa* (Müller, 1894)].

Explanation of Plate 7, 68

Fig. 1, ♀ car., ext. lt. lat. (neotype, **1980.17**, 580 μm long); fig. 2, ♀ LV, ext. lat. (Hancock Museum specimen, 650 μm long); fig. 3, ♀ RV, ext. lat. (**1980.18**, 570 μm long).
Scale A (250 μm; x 94), figs. 1 - 3.

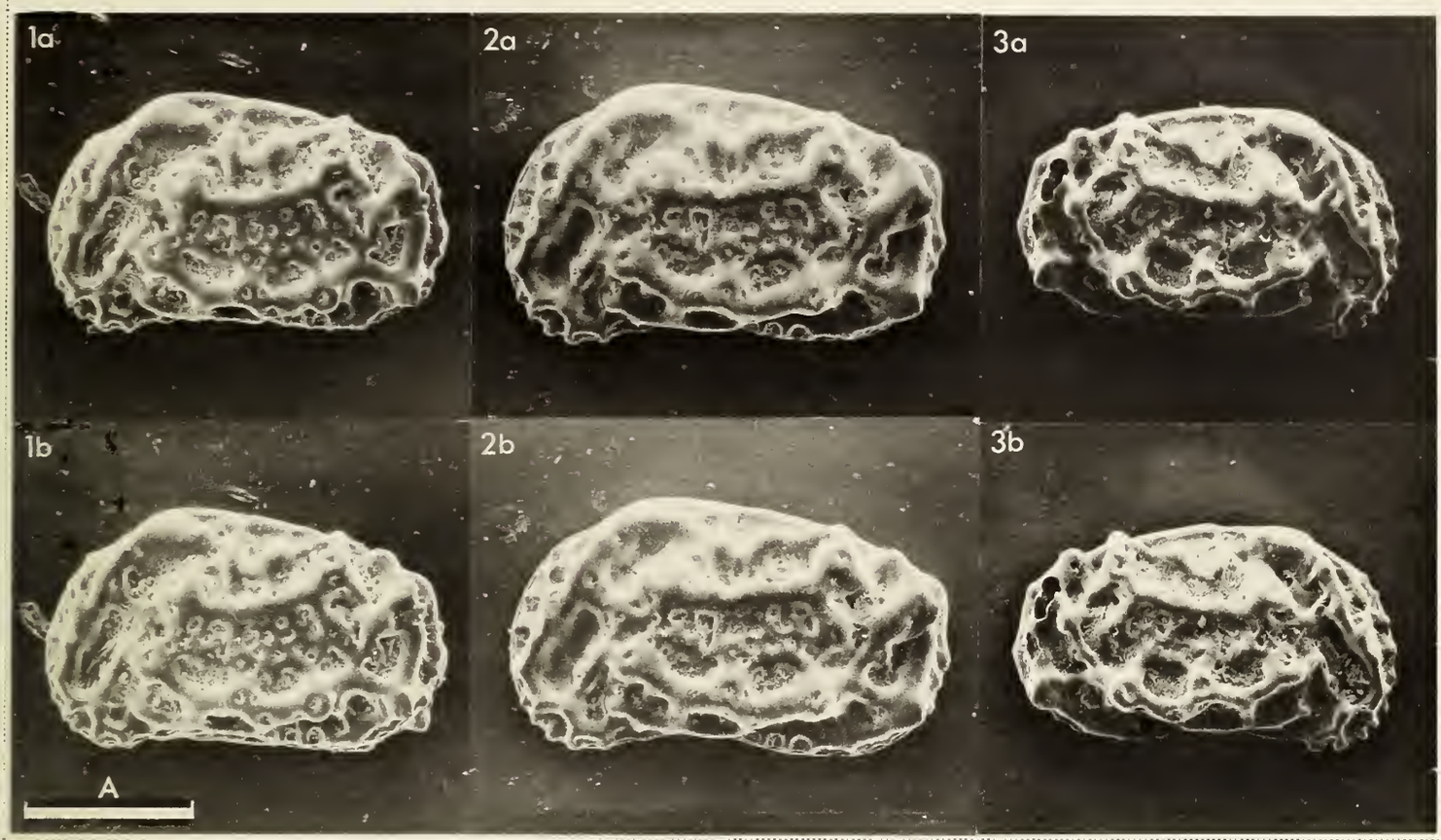
Neotype: (designated herein). Brit. Mus. (Nat. Hist.) no. **1980.17**, ♀ car.

Type locality: Tenedos (now called Bozcaada). W coast of Turkey, approx. lat. 39° 49' N, long. 26° 03' E; Recent.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. **1980.17** (neotype, ♀ car.: Pl. 7, 68, fig. 1), **1980.18** (♀ RV: Pl. 7, 68, fig. 3), **1980.19** (♀ RV: Pl. 7, 70, fig. 1), **1980.20** (♀ car.: Pl. 7, 70, fig. 2), **1980.21** (♀ LV: Pl. 7, 70, fig. 3); Hancock Museum specimen (♀ LV: Pl. 7, 68, fig. 2). **1980.17** and **1980.21**, from the type locality, were picked from dried residues deposited by H. B. Brady in the collections of the Palaeontology Dept., Brit. Mus. (Nat. Hist.). **1980.18**, from the Bay of Naples, approx. lat. 40° 50' N, long. 14° 15' E, was kindly given by G. Ruggieri. **1980.19** was collected live from silt in Morphou Bay, NW Cyprus, approx. lat. 35° 10' N, long. 32° 55' E, by J. Athersuch. **1980.20**, from a depth of 55m, off Rab, Yugoslavia, approx. lat. 44° 46' N, long. 14° 44' E, was collected by J. E. Whittaker. The Hancock Museum specimen, from Besika Bay (now called Besike or Koca Bay), NW Turkey, approx. lat. 39° 53' N, long. 26° 08' E, was found in the Brady ostracod collection; no catalogue number but placed in a separate, labelled slide.

Explanation of Plate 7, 70

Fig. 1, ♀ RV, ext. lat. (**1980.19**, 560 μm long); fig. 2, ♀ car., ext. dors. (**1980.20**, 610 μm long); fig. 3, ♀ LV, int. lat. (**1980.21**, 560 μm long).
Scale A (250 μm; x 94), figs. 1 - 3.


1a
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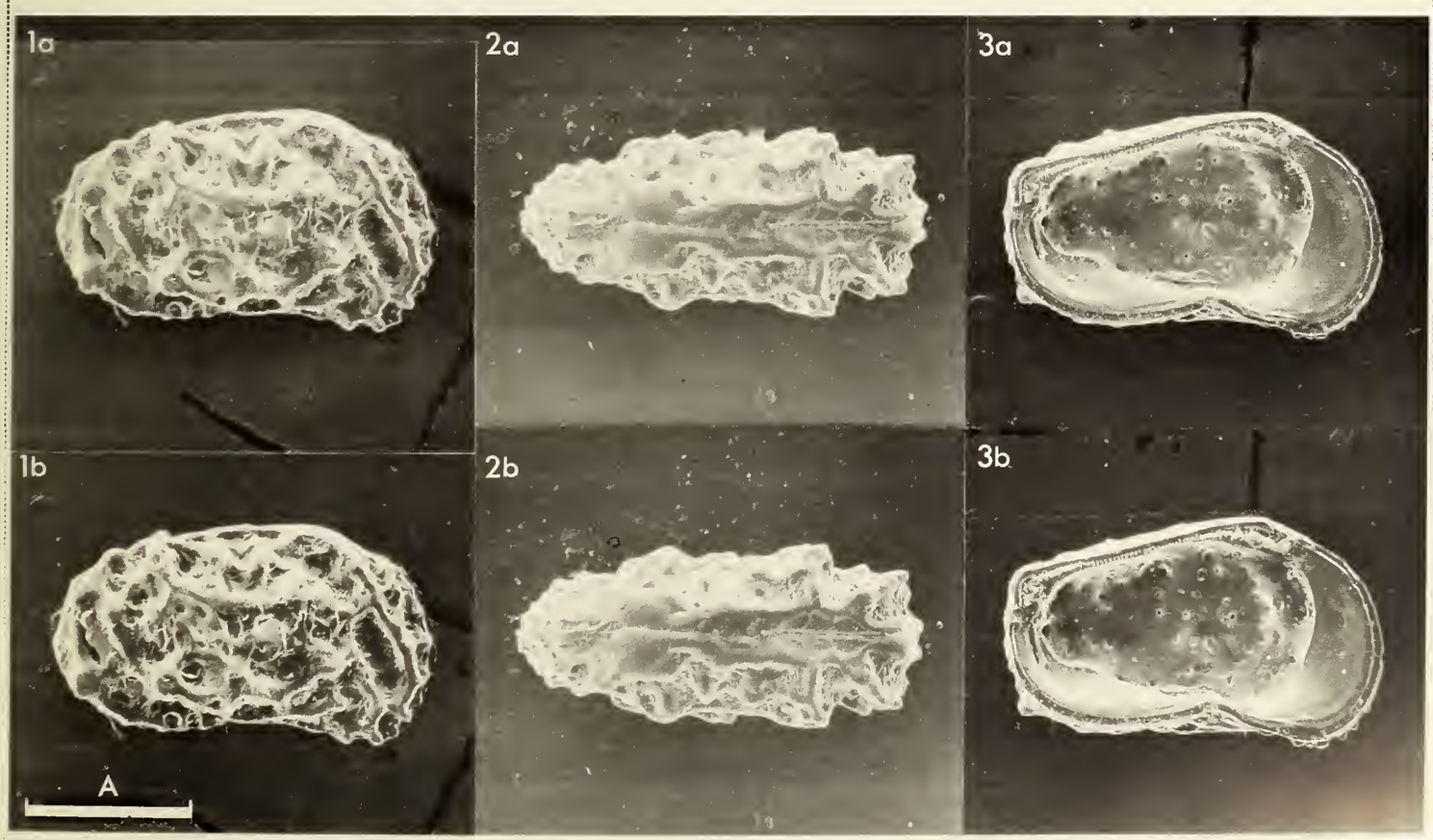
1a
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Diagnosis: Large (about 0.56mm long); carapace with prominent anastomosing, rugose ridges; one is continuous with the eye tubercle and runs obliquely forward to the anteroventral margin; behind this ridge lie two large, elongate fossae; two lateral ridges run back from below the eye tubercle and bifurcate posteriorly; the dorsolateral ridge is straight, having a U-shaped swelling anteriorly and its posterior branches swollen terminally; the ventrolateral ridge is depressed medially, its posterior branches terminating in strong ridges, each bearing an irregular tubercle.

Remarks: Brady's syntypic specimens of *Cythere crispata* from Tenedos could not be found in either the Brit. Mus. (Nat. Hist.) or the Hancock Museum, Newcastle-upon-Tyne, and are presumed lost. However, a bottle of residue from the type locality was found in the Brit. Mus. (Nat. Hist.), in the collection of Brady's brother, H. B. Brady, and this yielded several species of *Callistocythere.* The neotype (Pl. 7, 68, fig. 1) was selected from the only one of these species which conforms to the original illustration and description. In particular, the attitude of the ridges in lateral view, and the dorsal aspect of the carapace match extremely well. Furthermore, it is the only species in the Tenedos sample which fits the dimensions given by Brady (length $\frac{1}{45}$ inch = 560 μm), the others being considerably smaller.

The fact that no males of *C. crispata* are known suggests that this species reproduces by parthenogenesis.

Distribution: Known only from the E Mediterranean. Recent: Aegean (Brady, 1868; Barbeito-Gonzalez, 1971, as *C. diffusa* (Müller)); Adriatic (Masoli, 1968; Bonaduce, Ciampo & Masoli, 1976 (*Pubbl. Staz. zool. Napoli,* **40**), both as *C. adriatica* Masoli); Cyprus (J. Athersuch collection).

Stereo-Atlas of Ostracod Shells: Vol.7, Part 1

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